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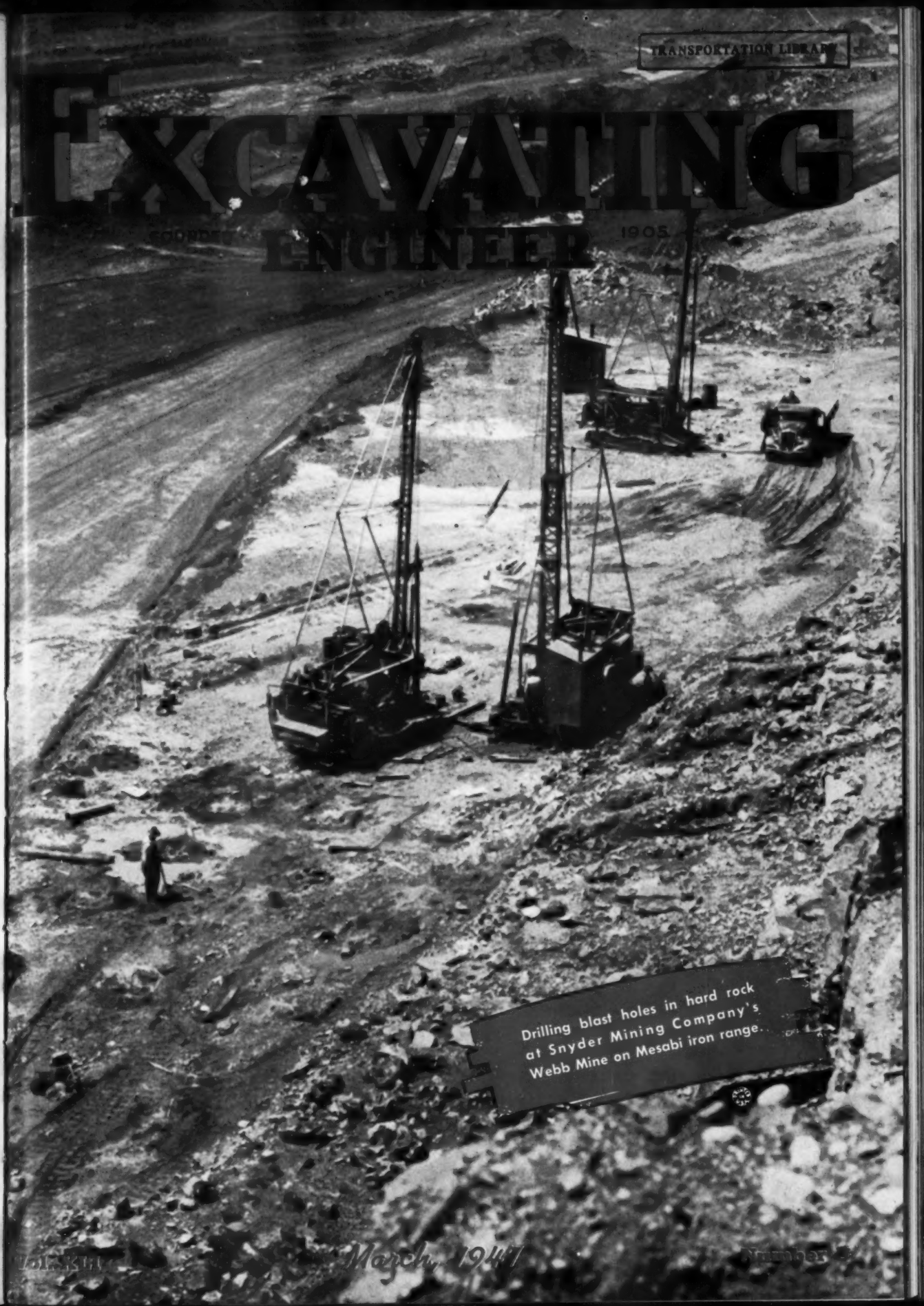

Drilling blast holes in hard rock at Snyder Mining Company's Webb Mine on Mesabi iron range.

Vol. XLII March, 1947 Number 3

an old story for BUCYRUS-ERIES

THE ABILITY of Bucyrus-Erie ⅜- to 2½-yard excavators to deliver a higher percentage of working time every day is one of the big reasons why they've proved their output superiority on every type of excavating job.

In their design the most careful consideration has been given to features that eliminate or reduce delays: adjustments that "stay put" are easy to make; machinery is arranged so that repairs, replacements, lubrication, etc., can be handled quickly; parts are kept simple, large, few in number — there is little that can go wrong; *all* operating control levers are conveniently grouped so that the operator can stay at his position and are easily manipulated to reduce operator fatigue; the digging cycle is smooth, balanced, and coordinated so that there is no overstressing of parts or excessive wear.

These and other Bucyrus-Erie features let you tackle a regular diet of day-and-night jobs with every assurance that you'll get a higher percentage of actual working time — and output — each shift.

you make the most of EVERY HOUR with a BUCYRUS-ERIE

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BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

EXCAVATING ENGINEER

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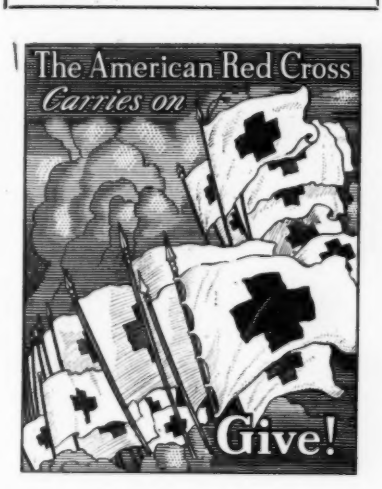
Front - End
LOADERS
For Industrial Tractors

Extensible Booms,
5/8-cu. Yd., Bucket 8-foot lift,
Backfiller Blades

White Mfg. Co.
ELKHART INDIANA



46 EUCLIDS

Moving Earth and Rock for

WORLD'S HIGHEST EARTH-FILL DAM

● A fleet of 20 Bottom-Dump and 26 Rear-Dump Euclids is moving earth and rock for construction of the world's highest earth fill structure—Anderson Ranch Dam near Boise, Idaho. Now nearing completion, this combination flood control, irrigation and power dam will be 456 feet high and will contain more than 9,000,000 cu. yds. of earth and rock. Sponsored by the U. S. Bureau of Reclamation, it is being built by Morrison-Shea-Twaits-Winston under the supervision of V. A. Roberts, project manager for the contractors.

Records from all types of mining and construction jobs are evidence of Bottom-Dump and Rear-Dump Euclid efficiency and long life on short and long hauls. Leading contractors prefer Euclids because of their speed in hauling and dumping, and for their versatility and profitable performance. Your Euclid distributor or representative will be glad to discuss your present or future hauling equipment requirements and provide helpful information.

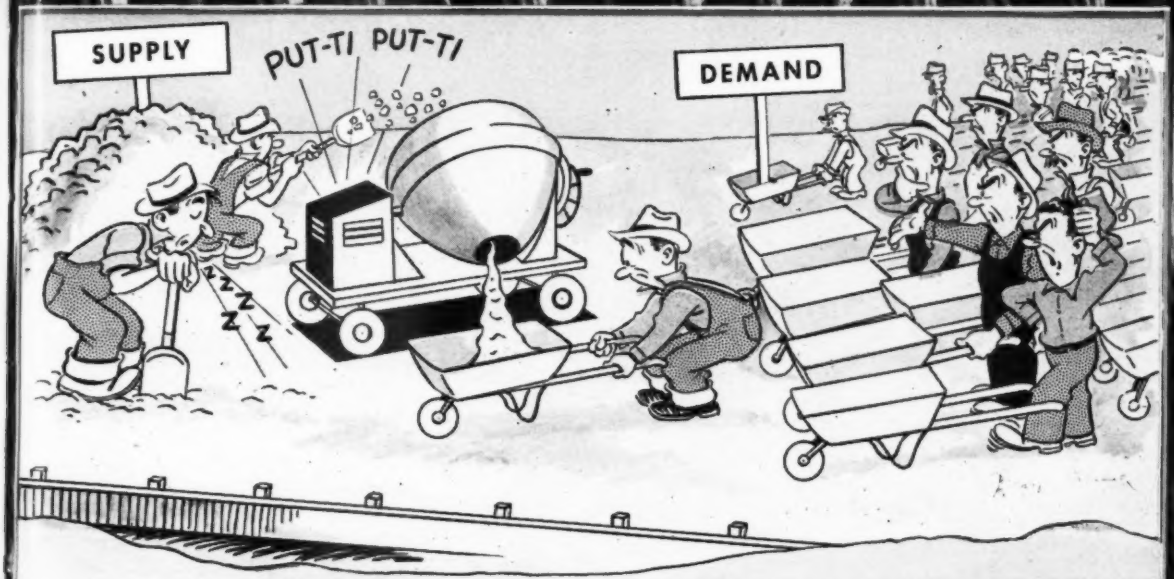
TOP: Rear-Dump Euclids place 18-ton loads of earth and rock on the fill.

CENTER: Bottom-Dump Euclid being loaded by a 5-yd. shovel with fill material from the stock pile.

Sturdy, universal hitch and ample clearances for drawbar and doors result in faster turning—a definite Bottom-Dump Euclid advantage.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

"A ROAD-UNITED STATES SHOULD BE VIVIDLY EXPLAINED TO ALL THE PEOPLE. . . . " Says Roscoe Ellard, Associate Dean of the Graduate School of Journalism, Columbia University!



IT'S HIGH TIME TO QUIT "PUT-TI-PUT-TING" AROUND AND GET TO WORK . . . AND HARD THAT IS!

We dislike to bring it up again—but it's no good to run away from the facts. The time and money America has lost since the war through erratic, insufficient, and high cost production would build many miles of roads, streets, railways, waterways and many, many bridges, overpasses, underpasses and airports.

It is these arteries of transportation which have played a tremendous and vital part in making America the most efficient country in the world. Summed up in Professor Roscoe Ellard's letter are basic facts which vividly show that continued expansion and improvement of these arteries are even more important to America's future than was their construction to America's past progress.

Hard work at the job of production and construction built the arteries over which America traveled to the world's highest standards of living. Only when we get hard to work again will all the people be able to journey on to even higher standards of living.

The responsibility rests on every citizen in proportion to the rewards he expects to get. This means that, individually and collectively, the road building industry and profession is called upon to make the greatest contribution in work and experience and in educating a substantial portion of 140 million citizens on the value of the public's stake in a Road-United States.

union Wire Rope corporation

2142 MANCHESTER AVE. KANSAS CITY 3, MO.

Moving a Mountain Into the Sea

By OWEN H. BARNHILL

• Aerial panorama from over the borrow pit. Macco-Morison-Knudsen haul road runs from borrow pit three miles to airport where fill is being made in San Francisco Bay.

THE TIME—last half of 1946 and first month of 1947.

The place—Mills Field, municipal airport, west shore of San Francisco bay, 15 miles south of San Francisco.

The job—Moving 6,000,000 cu. yds. of earth into an arm of San Francisco bay.

The purpose—to enlarge a landing field by adding in compacted layers select material three quarters of a mile long, one-half mile wide and ten feet thick.

The workers—500 employed by Macco Corporation and Morrison-Knudsen Company, Inc., in joint venture.

The contract — approximately $4,000,000.

The machines — 72 dump-trucks, including 30 33-yd. Southwest wagons pulled by 200-hp Peterbilt Diesel tractors; a similar number of 13-yd. Euclids; 12 16-yd. clamshell Dixsons, plus a half-dozen rented trucks of various sizes and types; three Bucyrus-Erie 120-B electric shovels to which they have applied 6 cu. yd. dippers, three Northwest 80-D 2½-yd. shovels and a Lima dragline; 20 Caterpillar D8 tractors with Caterpillar, Le Tourneau and La Plant-Choate bulldozers, one TD-18 International tractor and two 12-cu. yd. Le Tourneau scrapers; four Caterpillar Motor Patrol graders, three Austin-Western rollers and much miscellaneous equipment.

The haul — over a $300,000 three-mile especially-constructed access road crossing two busy highways—Bayshore and El Camino Real—a double-track railroad (Southern Pacific) and Market Street double-track car line.

The working material — sedimentary sand partially solidified into rock.

The problems—how to attain and maintain production at reasonable cost; prevent road from getting dusty when dry and slippery when wet; reduce noise of huge Diesel trucks operating day and night and avoid injurious blasting vibrations.

There's a picture to stir the imagination of any construction project manager, especially one like O. H. Tucker, "who, when hearing a challenge, rises refreshed." "Tuck," as he is called by his associates, superintended a similar project early in the war—adding 160 acres to Mills Field, working for the same contractors.

Having a head start, with access road already built and borrow pit opened up, enabled Tuck's army of workers to make good time almost from the beginning of operations. By August, giant trucks were being loaded at an average rate of two a minute—2,500 loads in a working day of three 7-hr. shifts—and sent speeding on their way from mountain to Bay, transporting up to 37,000 cu. yds. of material in 24 hours. Nearly a million three-foot cubes of dirt were dumped, spread and rolled in August.

During September this record was raised to 45,000 cu. yds. a day, enough material to cover three acres of land ten feet deep. By the first of October the yardage gauge registered three million. Tuck's men were trying to finish the job before winter rains might force a suspension of operations.

Equipment Policy

Asked what type of trucks and power shovels he preferred, Tuck-

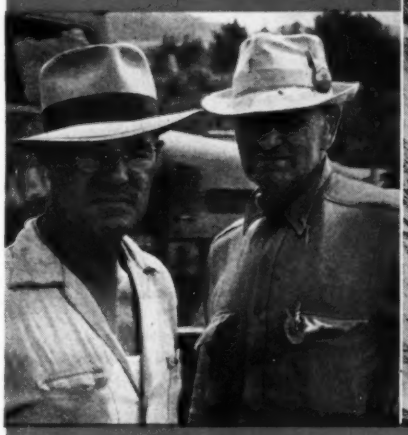
er replied, "The bigger the better."

That answer indicates one reason for the success of the Macco-Morrison-Knudsen team — large equipment. Another is, plenty of machines. In order to have sufficient equipment to keep a steady stream of material—earth, rock or concrete—flowing swiftly onto location, these well-known contractors joined forces and purchased whatever additional machines were needed to operate at maximum efficiency on this nine-million-ton job. Paying up to a thousand dollars for a single truck tire and a hundred times that amount for a power shovel is considered amply justified by results obtained.

Overhead must be kept down, else profits will not pile up, these constructors realize. It makes all the difference in the world whether a given number of men and machines complete a contract in one year or two, hence speedy construction is a mark constantly aimed at. Machines laid up for repairs need not mean a slowdown in operations, if there are sufficient reserves of standby equipment to replace them.

No expense was spared to build a good, all-year access road, which leads almost three miles across marsh meadows to the mouth of a small canyon in the foothills between San Francisco Bay and the Pacific Ocean. Material for this three-lane truck highway was excavated from the future borrow pit, where a large tract of rough land had been purchased. The road rises from the landing-field to a height of 26 feet where it crosses

• Above: O. H. Tucker, project manager, discusses job with A. J. Wehner, project manager for the City of San Francisco. Below: Lex Hobson, master mechanic, and Trace Baker, truck foreman.



• Above, Right: Upward view of dozer working at 200-ft. level of benched borrow pit face. Earth loosened by blasting in successive ledges is dozed over the edge down to the pit floor where it is loaded by power shovels. Below: Common scene at truck refueling station where 1,500 gallons are pumped into truck tanks in 30 minutes.

• Double spotting method is used for loading trucks with these two Bucyrus-Erie shovels to which 6-cu. yd. dippers have been applied. The shovels are loading at the base of a 260-ft. face of the borrow pit. The LeTourneau dozer is used for cleaning up.

over a bridge above four railroad and streetcar tracks. Grade levels vary between this and the two highway bridges, returning to ground level where the road reaches the foothills. It is paved with a ten-inch slab of asphalt-concrete.

There are only two entrances to this private highway, one at the fill beyond Bayshore highway and the other at Millbrae, on El Camino Real, where the contractors' office and repair yards are located. The road is fenced with barb wire and posted with warning signs to trespassers.

Bridges Across Tracks and Roads

The steel bridge across the four railroad and streetcar tracks is 160 feet long and 40 feet wide, supported by three 26-ft. pillars at each end and three in the middle, V-braced crossways. Each pillar is made of two 3″ x 14″ channel beams lattice-bolted together.

The bridge floor is composed of wood planks resting upon 12″ x 12″ beams which are set upon 10″ x 24″ steel I-beams 12 feet apart. Two 10-inch by eight-foot I-beams, one on either side of the bridge, serve both as bannisters and as trusses to support the structure.

The access road is carried across a telephone line and dirt road east of the rail lines, which they adjoin, by a wooden extension of the steel bridge, 60 feet long and 28 feet wide, supported by steel pillars. Similar but smaller, lower steel bridges cross the two six-lane highways.

How to keep the access highway usable during wet spells is a difficult problem. Decomposed sandstone dropped off the heaped-up trucks is soon rolled smooth, much like clay, becoming quite slippery after a shower. John Flynn, San Francisco consulting chemist, suggested sprinkling the road with calcium chloride but this is only a temporary expedient.

Another problem on which Flynn has been working is abatement of the noise nuisance, result of high-powered Diesel trucks roaring over the access road, night and day, between two populous communities, San Bruno and Millbrae. He suggested that all engine exhaust pipes discharge upward, because sound released vertically is more quickly dissipated than when sent out laterally to rebound against buildings, hills and other objects.

Mufflers have been tried, but they are not made for Diesel engines larger than 150-hp and reduce the noise only 10 to 15 per cent and are ineffective while changing engine gears. Furthermore, space is not available, as in Diesel locomotives, for installing mufflers of sufficient size for adequate silencing. Elimination of

• Haul road to borrow pit is maintained by this Caterpillar Diesel No. 12 motor grader. Contractor's office and repair yards are in background.

the graveyard shift was also considered.

Another unusual problem troubling the contractor is the alleged damage to nearby buildings by borrow pit blasting. Although only small quantities of low-power explosives are detonated, owners of homes as far away as three miles claim that plaster walls have been cracked by the subterranean shots. In order to obtain scientific data for use in a resultant lawsuit, the contractors employed a geologist to record seismographic vibrations during shooting.

The Truck-loading Factor

How to attain and maintain maximum excavation in a narrow canyon, where space for operating large equipment is limited, is another problem. With a comparatively short haul and plenty of high-speed trucks of large capacity, level or downhill pull all the way, unlimited quantity of easily excavated material available—plus other favorable factors—truck loading becomes the limiting operational factor.

In order to carry the access road to the borrow pit and obtain pay loads, cuts were made in the hills on either side of the gulch. Overburden was used to fill a ravine in the center of canyon. When the head of the depression was reached, operations were centered on Hill No. 5, 260 feet high, most of which is to be removed, leaving a specified slope, considered safe, at either end.

Between this hill and higher ones on the other side of the canyon, toward the ocean, there is a narrow pass leading northward to the head of another gulch. A cut is being made through this depression, bringing the notch down to the canyon floor level, in order to lengthen the 700-foot-long face of Hill No. 5, where available space now limits operations.

Spotting a truck carrying up to

• Right: Caterpillar D-8 dozer leveling fill material at airport extension site. Below: Use of bottom dump wagons greatly reduces work of spreading loads.

• Left: One of three Northwest 2½-cu. yd. shovels loads 16-cu. yd. Dixson wagon. Below: Dixson wagon opening with clamshell action to dump on fill.

33 cu. yds. of material, while another stands by waiting its loading turn, takes a lot of room, especially when huge earth wagons are arriving and leaving the pit every half minute.

Because of the vibrations mentioned, no blasting is done at the toe of the wall, where it is most needed. The dark blue formation, which looks like rock when loosened, is easily excavated and pulverized in handling. Beginning at the top, earth is loosened by blasting in narrow, successive ledges, then dozed over the edge, forming a 1-1 slope or flatter down to the pit floor, where it is loaded with power shovels into trucks.

Drilling Operations

The drilling contract was sublet to A. S. Mayes, San Francisco, old-time oil driller, who uses two rotary shop-built rigs. Sixteen-foot drill-pipes operate in a 30-ft. tower, turning a 7-in. flanged drill, through which water is forced under 700 pounds pressure.

Water is run through 1,000 ft. of 2-in. canvas hose from a large supply tank several hundred feet back of the firing-line. From the gulch north of the pit where a pumping-plant of the Crystal Springs municipal system is located, water is forced through a 3-in. surface iron pipe to the tank atop the hill.

The formation is so easily drilled that a 70-ft. hole sometimes is put down and drill rig moved to another location in an hour. Distance between the 60-to-70-ft. holes varies considerably. Greatest difficulty is in holes closing where soft spots are encountered before a powder charge can be planted. When this happens, another hole is sunk a few feet away.

Power shovel operation, while vitally important, is one of the easiest, simplest jobs on the contract, because the equipment employed is modern and efficient, seldom gets out of order or needs repairs.

One feature of the Bucyrus-Erie shovels especially appreciated is the regenerative action of the Ward-Leonard 275-hp motors with which they are equipped. This utilizes retarding motion as a source of power recovery, by causing the motors to become generators when serving as brakes, thus returning power to the line and conserving current. Company transformers reduce the current used by these shovels to 230 volts. Pacific Gas and Electric Co. installed electrical equipment in the pit for day and night work.

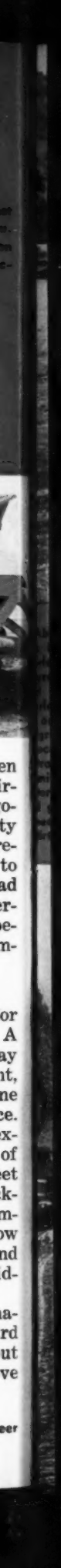
An inspector from the city engineer's office, stationed between Bay Shore boulevard and the airport, checks every load of dirt going to the fill area. Both quantity and character of material are recorded, different kinds going to separate locations. A heaping load is credited with only about 85 percent of its yardage, allowance being made for shrinkage in compacting.

Foundation for Fill Slab

Preparing a solid foundation for the fill slab presented problems. A mass of soft mud fills the Bay along the west shore at this point, sloping from above the water-line to a few feet below the surface. Using a dragline, a trench was excavated along the south shore of the landing-field, eight to 12 feet deep most of the way, then backfilled immediately with decomposed sandstone from the borrow pit. This strip was compacted and built up to grade as it was widened with additional material.

Filling in and rolling solid material forces soft mud southward along the shore and eastward out into the Bay, crowding it above

(Continued on page 171)



Straight Roads

Tractor equipment plays important role in road straightening projects being conducted by many highway departments in effort to make highways safer and better able to carry heavier traffic loads.

Above: Howard Price & Company, Huntington, W. Va., Heil cabledozer mounted on an International TD-14 crawler tractor to pile material for loading to trucks by Bucyrus-Erie ¾-cu. yd shovel in background on six-mile straightening contract on Route 60 between South Charleston and Huntington. About 300,000 cu. yds. of earth and rock were moved on this job. Below: Bucyrus-Erie motorgrader on International TD-18 crawler tractor grades relocated section of U. S. Route 1 in Virginia on 2.85 mile contract of R. H. Rose, Richmond, Va., on U. S. Route 1, 7 miles north of South Hill, Virginia. Galion road grader in background of picture will be used for final grading. Behind the motorgrader a Baker bulldozer-equipped tractor is hauling a sheepsfoot roller for compaction. About 220,000 cu. yds. of dirt were moved on this job.

Over 50,000 units of snow removal equipment, much of which is used to construct and maintain roads the rest of the year, is needed to keep clear of snow 300,000 miles of roads, not even considering municipal snow removal problems.

snow-

$30,000,000 pain in the nec

SNOW REMOVAL FROM American highways alone costs more than $30,000,000 a year, and this is apart from the astronomical figures borne by cities in "the snow belt." Snow may add charm to the landscape and make a paradise of feather-tipped boughs to be admired through warm windows, but it is a $30,000,000 pain in the neck to highway officials charged with removing snow quickly from roads.

The annual highway snow removal problem involves the use of about 50,000 units of snow removal equipment and requires keeping clear of snow 300,000 miles of road. In general, excavating equipment used to construct and maintain roads the rest of the year is adapted to snow removal in the winter.

Totals of the cost of snow removal from city streets are not available but these costs run into enormous sums for operation alone, to say nothing of millions in business and employment losses due to snow.

• Opening drifts of hard-packed snow near Panora, Iowa, with Caterpillar diesel Motor Grader with cab and V-type plow.

All snow removal, however, is not for business reasons, for 54,000 communities in United States have no rail connections and must depend upon highways for their very existence.

As an element for making a road impassable, snow is even more effective than mud for it is no respecter of highway surfaces. It makes no difference whether a

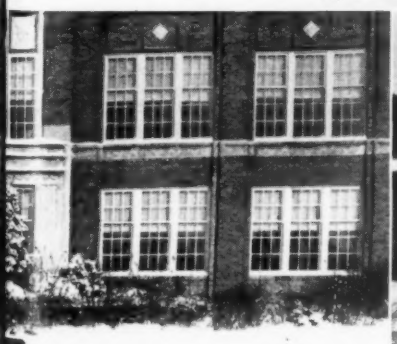
(Continued on page 171)

• Left: Watertown, South Dakota, street opened by a Bucyrus-Erie Dozer-Shovel equ with a special snow bucket following a bi zard. Below: An Allis-Chalmers Model B and snow plow clear up walks surround high school in West Allis, Wis. (Picture through courtesy of The Watertown (S.D.) Reminder.)

• Above: Marshall County, Ill., uses Caterpillar Motor Grader with snow plow to open a farm-to-market road. Below: E. P. Breen of Minot, Mass., uses a special snow bucket on his Bucyrus-Erie ⅜-cu. yd. shovel and a B-E bull-dozer, to clear Boston streets.

t: Keeping roads open to oil wells of Creek Lease, near Craig, Colorado, with illar Motor Grader with snow plow and This is reported to be the highest oil in the world, with an elevation of 8,370 temperature goes to 25° below zero the winter. Above: Allis-Chalmers HD-ctor with Baker snow plow clearing a to-market road for the Town of Cabot, nt.

• Left: LaPlant Choate V-type snow plow mounted on Caterpillar D6 tractor owned by the township working near Gratiot, Wis. Below: Verdev Trucking Co. of South Milwaukee, Wis., uses its Bucyrus-Erie Dozer-Shovel to clear manufacturing plant parking area.



Bayshore Freeway Started

By ROBERT J. GREEN

• Interrupting its regular work of ditching for under-drains, this Bucyrus-Erie ¾-cu. yd. dragshovel is working along the toe of the main fill to locate some buried utility lines.

Contracts by Macco-Morrison-Knudsen Co., Guy F. Atkinson Company, and Piombo Brothers now under way on San Francisco's Bayshore highway. Macco - Morrison - Knudsen contract for $5,000,000 is largest California State Highway Department award ever made.

CONSTRUCTION WORK ON the new Bayshore Highway at San Francisco, involving the largest expenditure of California Highway Department funds ever to be awarded in one contract, is now a reality. Three projects now under way will provide new highway transportation from a point 2½ miles south of Burlingame to downtown San Francisco. The new thoroughfare will handle up to 40,000 vehicles a day.

The new expressway will have two paved strips separated by a dividing island, each designed for three lanes of traffic. Automobiles from side streets in Burlingame and other suburban cities south of San Francisco will travel over a service highway to special merging intersections. Access of all vehicular traffic will be controlled.

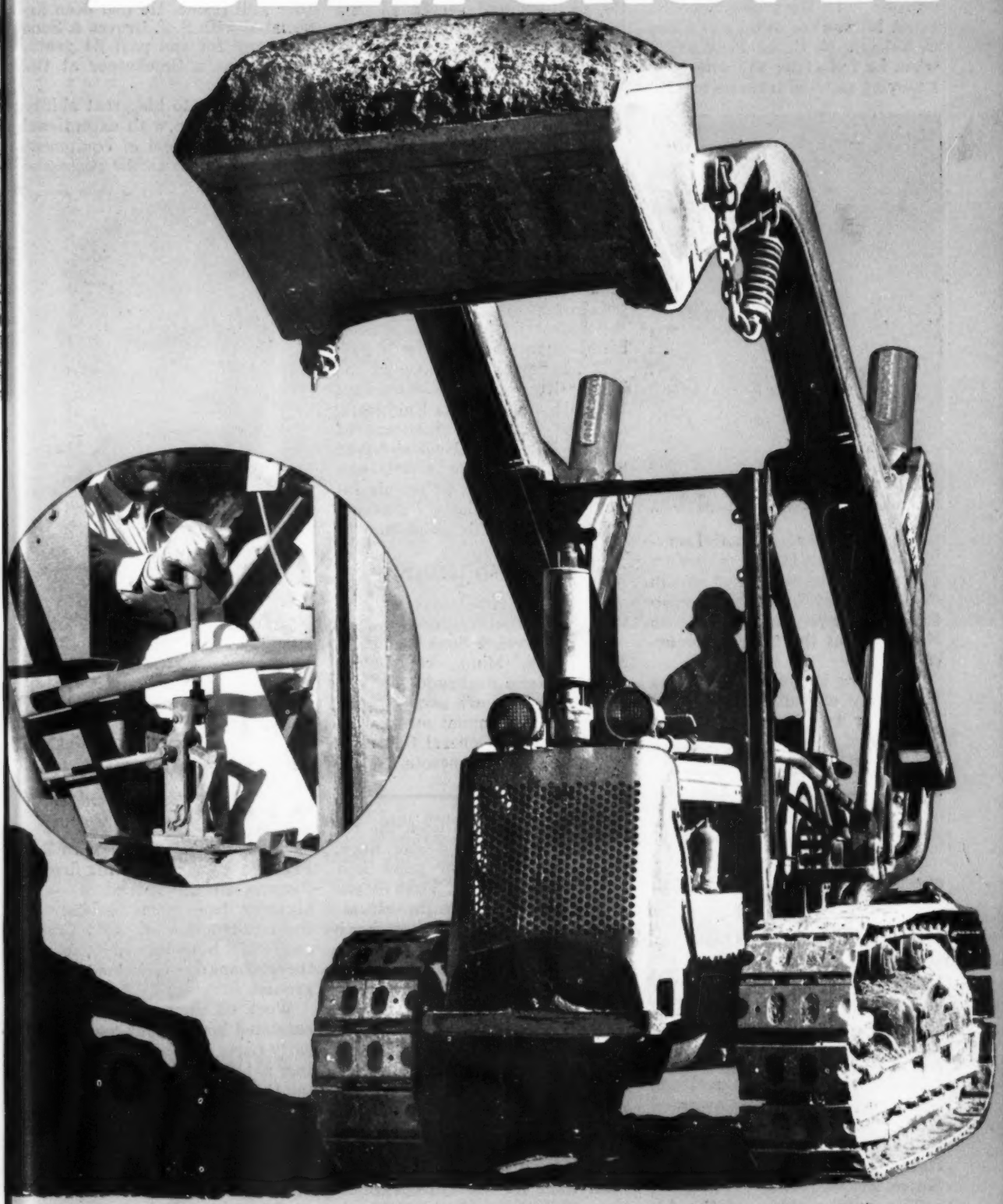
• Caterpillar tractors, LeTourneau Carryalls, and a Caterpillar motor grader work on part of the grading contract.

The $3,000,000 contract award of 5.097 miles to Macco Corporation and Morrison-Knudsen Company of Los Angeles on a joint venture is the largest state highway award ever made, according to Project Manager O. H. Tucker. The Macco - Morrison - Knudsen contract extends from Colma Creek near South San Francisco to Broadway Avenue in Burlingame.

Due to the congested metropolitan building over much of the San Francisco peninsula, the supply of dirt for embankments has been somewhat of a problem. On the Macco-Morrison-Knudsen contract the embankment earthwork is being handled simultaneously with an airport extension from the company-owned borrow pit near the town of Millbrae. A fleet of Euclid wagons, Peterbilt trucks and Dixson wagons is being used partly on the freeway and partly on the airport. Three Bucyrus-Erie 120-B shovels, to which they have applied 6-cu. yd. dippers,

(Continued on page 144)

A DOZER-SHOVEL



NDUSTRIAL TRACTOR DISTRIBUTOR

Rowland W. Barr

Rowland W. Barr, 47, of Milwaukee, manager of the dredge division of Bucyrus-Erie Co., South Milwaukee, Wis., was killed in Raleigh, N. C., on February 3 when he fell under the wheels of a moving railroad train he was attempting to board. Memorial services were held in Milwaukee on February 7 and interment was in California. Mr. Barr was on a business trip from Tampa, Fla., to New York at the time of the accident.

Mr. Barr graduated from the University of California in 1924 and after two years as an apprentice of General Electric Co. he started working for Bucyrus Company as an electrical engineer. In 1928 he went to Chile for the Anglo-Chilean Nitrate Co. He transferred to the Braden Copper Co. in 1933 and served as this firm's district engineer in Chile.

He moved to Columbia in 1938 and became mine manager of the Pato Consolidated Gold Dredging Co. He returned to the Bucyrus organization in 1945.

Mr. Barr's wide experience in the mining industry coupled with his thorough training in his chosen field of electrical engineering marked him as a leader. Men in all walks of life grasped his wealth and breadth of character at first word, and his ability to put theory into practical use in this industry will long be remembered by those who knew him.

Mr. Barr was a member of the University Club, the American Institute of Electrical Engineers, and the American Institute of Mining Engineers. He is survived by his widow, Arlene; a son, John G., a student at the California Institute of Technology, Pasadena, Cal., and a daughter, Betita.

C. J. Gardner

Mr. C. J. (Neal) Gardner, 43, vice-president-secretary-treasurer of S. J. Groves & Sons Company, Minneapolis, Minn., contractors and engineers, died suddenly January 7 of a heart attack while attending the annual meeting of the Associated General Contractors in St. Paul, Minnesota.

Mr. Gardner was born in Redwood Falls, Minnesota, and completed his high school education there, where his mother and father still reside. He had been associated with S. J. Groves & Sons Company for the past 24 years, starting as a timekeeper at the age of 19.

In addition to his great ability as an executive with exceptional talents in the field of equipment and labor relations, he possessed to an unusual degree an inherent sense of duty, loyalty and obligation to his fellow men.

Mr. Gardner, who lived in Minneapolis, is survived by his widow, Estelle, two sons, Francis Cornealius, and Peter James, and two daughters, Enid and Susan.

Bayshore Freeway

(Continued from page 140)

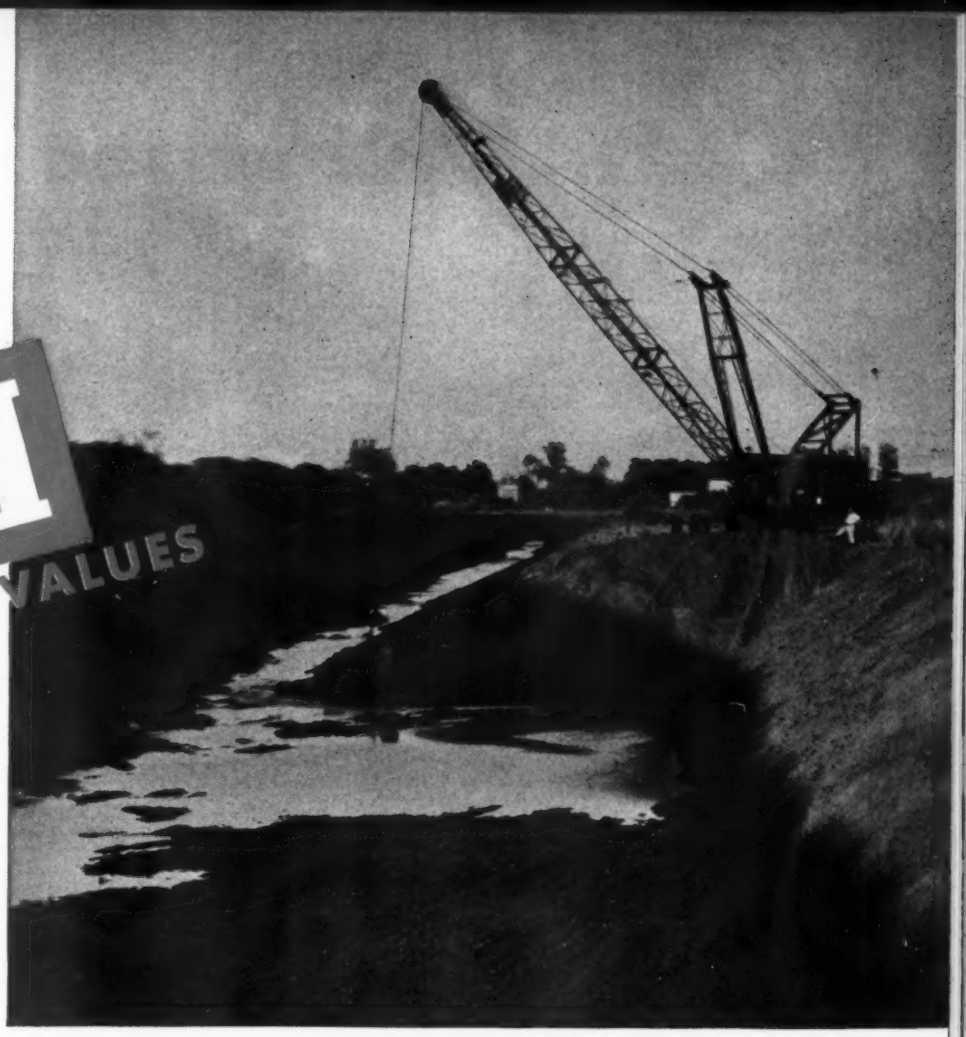
spotted in the pit, load these hauling units. The output of 30,000 cu. yds. per 24-hour day has been divided by routing about 30 per cent to the highway job.

Farther south, the Guy F. Atkinson Company of South San Francisco is being forced to haul 250,000 tons of imported embankment dirt a maximum distance of ten miles. The Atkinson contract, 2½ miles in length, was awarded on their low bid of $627,782. This job will extend the new freeway from Burlingame south to San Mateo.

The main problem of the Atkinson contract has been the removal of water and gas lines, telephone and power poles and other public utilities. Time extensions over and above the 175 allowable working day limit have already been granted. While Atkinson's fleet of hauling trucks has been busy on the long imported borrow haul, a Bucyrus-Erie ¾-cu. yd. dragshovel has seen a great deal of service in connection with the hunt for buried utilities. This machine more than once has interrupted its regular work of ditching for under-drains to walk several hundred feet to uncover a buried water pipe. It has also been used for structure excavation, having shovel and crane attachments.

Farther north, near South San Francisco, the contracting firm of Piombo Brothers hold a state highway department contract for the construction of sand drains and the building of part of the embankment across marshy ground.

Work on the new freeway has consisted largely this year of the early parts of construction: clearing, grubbing, grading and shaping the embankments. In 1947 the placing of crusher run base course material and the laying of portland cement and asphaltic concrete surfacing will make the first miles of the new super-thoroughfare a reality.



"Slickest Swing we ever knew!"

You'll hear owners say it again and again — wherever you find the P&H Model 1055 on the job. And you'll find them all over the country.

It's not surprising that the P&H Magnetorque Swing should be such an outstanding success. For swing clutches have always been a major source of trouble.

ELIMINATES SWING FRICTIONS

P&H removed the cause of trouble by replacing the swing frictions with Magnetorque units, mounted in the same relative position. They transmit power for swing motions without mechanical linkage, without friction — without wear.

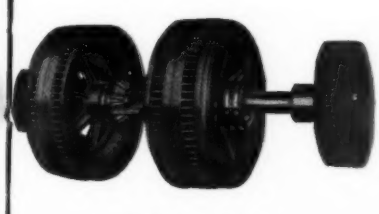
SPEEDS PRODUCTION

Swing is smoother, faster, more responsive. Quicker, more accurate starts and stops eliminate waste operating time—increase daily production — cut yardage costs.

NO MORE MAINTENANCE

You need never lose another day — or even an hour — because of swing clutch maintenance, repair or replacement. The P&H Magnetorque unit will last the life of the machine.

Users will tell you it's one of the most important improvements ever made in the field of large excavators. That's why users won't be without it . . . why they reorder. Ask for complete information.



THE P&H MAGNETORQUE SWING

Electromagnetic forces transmit power for both swing and propel . . . magnetic pull instead of mechanical friction. Electric current is supplied by a small generator on the main engine — controlled from operator's station. Swinging slow or fast, has cushioned acceleration and deceleration. Swing friction maintenance is eliminated. It's another important P&H Added Value.

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Shots from the FIRING LINE

Advocate Plan to Cut Road Building Costs

In a move towards reduction of highway construction costs, the Joint Cooperative Committee of the American Association of State Highway Officials and the Associated General Contractors of America recommended that both the A. G. C. and the A. A. S. H. O. at their conventions study unnecessary costs incurred in highway specifications.

The committee stated in a resolution that it had carefully studied needlessly costly practices in highway construction which "involve a considerable amount of unnecessary labor costing the contractor and the public beyond all proportion to the advantages received."

Points emphasized in general were: (1) certain refinements can be eliminated insofar as contractors will cooperate by satisfactry work: (2) specifications writers would do well to outline such tolerances as can be obtained by use of machinery only and without expensive hand labor; (3) further progress on the problems of unnecessary refinements can be made and the highway dollar conserved by intensive study on the state and local level between representatives of A. G. C. highway contractor groups and highway officials.

Particular reference was made to certain practices on secondary and farm-to-market roads under the Missouri State Highway Department and approved by the Public Roads Administration, such as elimination of hand-rubbed concrete surface finish, more liberal tolerances definitely set forth, 90 per cent compaction of fills instead of 95 per cent, and revised segregation of items of work such as lineal mile grading under certain conditions.

C. M. Hathaway, engineer of construction, Illinois Division of Highways, who presided at the meeting, announced that a special sub-committee will resume a study of general provisions in specifications.

Analyzing Costs

Worthwhile suggestions for reducing unnecessary costs were reported forthcoming from contractors in many states. It was the sense of the meeting that encouragement of better liaison between contractors and engineers is a "must" program of local A. G. C. groups as a matter in the public interest.

Some objections were advanced by engineers to the current PRA policy of requiring special cost analyses under certain conditions. On behalf of the PRA, it was asserted that this practice had served a good purpose and that the agency's non-concurrence in awards on high bids is diminishing.

The PRA was reported agreeable that the procedure be simplified so as to eliminate much detailed data. The agency is interested primarily in cost data on projects where bids are over the 50 per cent criteria.

Several committee members asserted that the fundamental basis for awards lies in securing adequate competition for work, and that there are so many uncertainties in future jobs that cost analyses of previous jobs offer no adequate basis for estimating cost of new work.

After discussion of current regulations which require contractors to submit several copies of payroll data on a special form and detailed quantities and costs on 15 different items of materials, the committee recommended that these reports are no longer necessary and that the A. G. C. at its January convention take appropriate action towards their elimination.

These requirements originate in acts of Congress and can be eliminated only by Congressional action. The Bureau of Labor Statistics and Department of Labor are delegated powers to collect data on work financed in whole or in part with federal funds, and the PRA acting as agent for the BLS, gathers both payroll and materials data.

Objections to this procedure were based on the cost of preparing reports, and it was suggested that summations would serve the purpose in lieu of detailed information.

The committee recommended that the A. G. C. take appropriate steps to assist in adjusting salaries of highway engineers. The A. A. S. H. O. also has a special committee working on this problem.

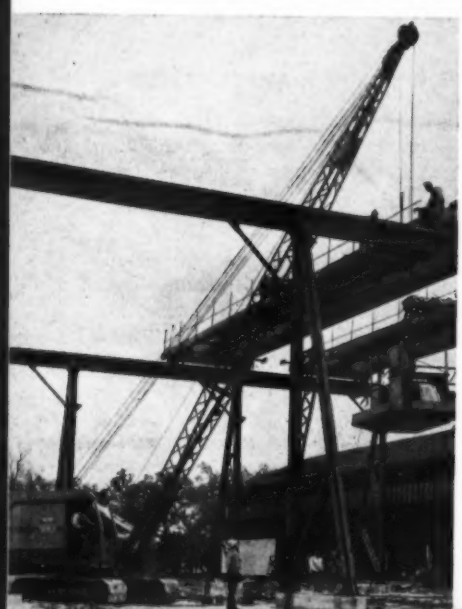
A resolution was adopted to the effect that, as a matter of general policy, the owner should not purchase the materials, but this function should be exercised by the contractor in order to maintain full control of the job necessary for maximum efficiency.

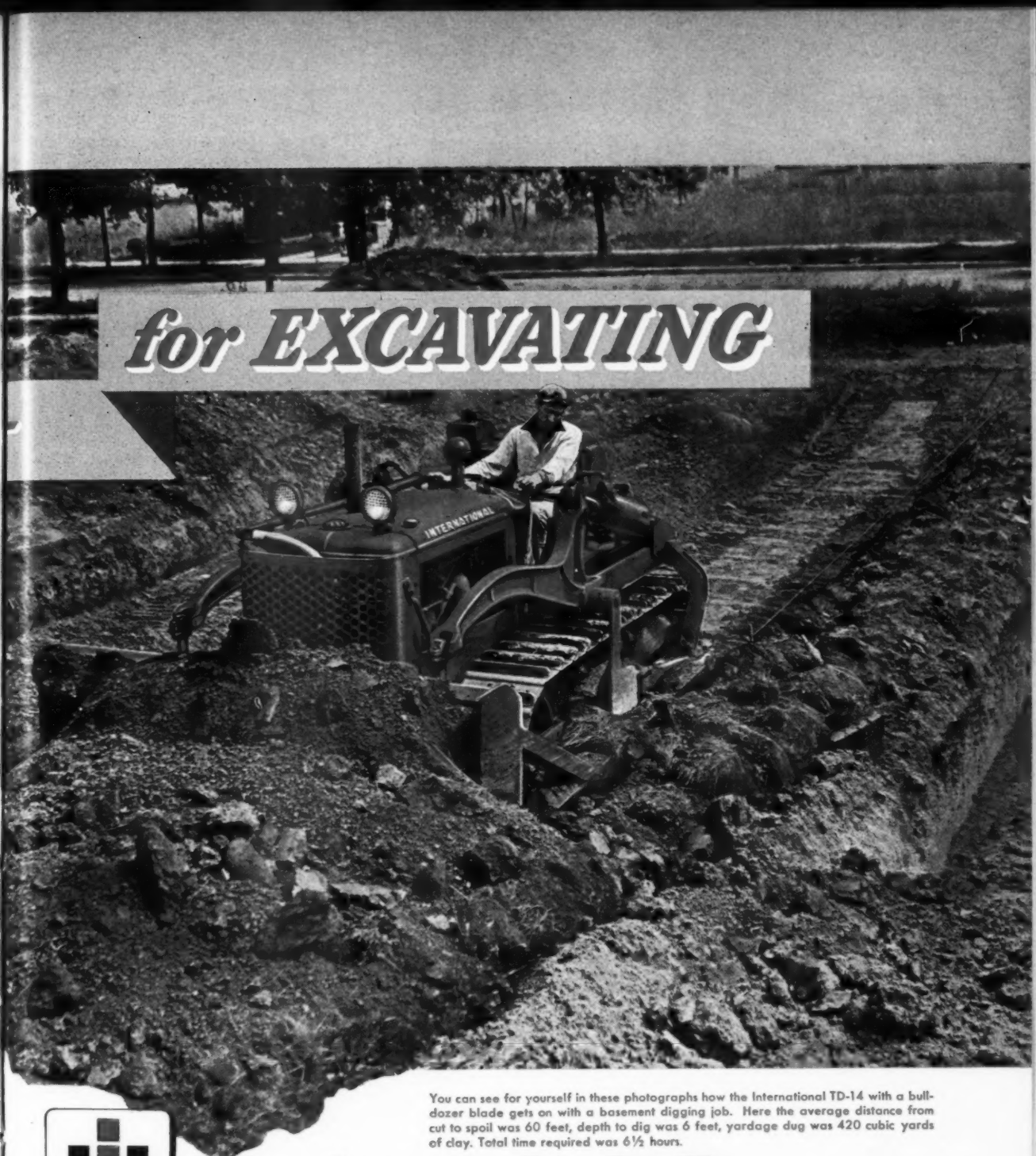
It was explained on behalf of the PRA that it opposed the purchase by states of materials in large quantities for allocation later to particular contract jobs, but that the current situa-

(Continued on page 150)

• One-fourth of the $8,000,000 appropriated is being spent on a comprehensive postwar program to improve the roads, grounds and entertainment facilities at the famous Lake Arrowhead resort near Los Angeles. Two No. 12 motor graders, like the one here owned by J. E. Haddock, Ltd., Pasadena, California, are used to rebuild the roads and enlarge parking areas in Lake Arrowhead Village.

• Lufkin Foundry & Machine Co., Lufkin, Texas, sets beams and parts for an overhead crane and assembles furnace with Bucyrus-Erie 22-B crane at owner's plant.

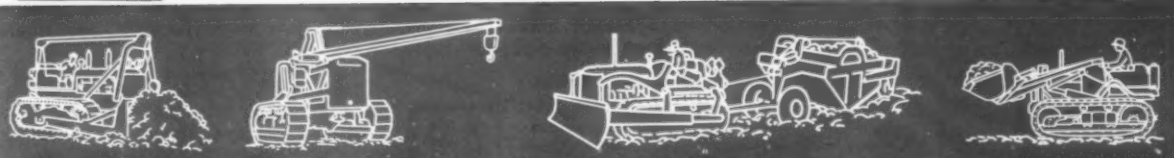


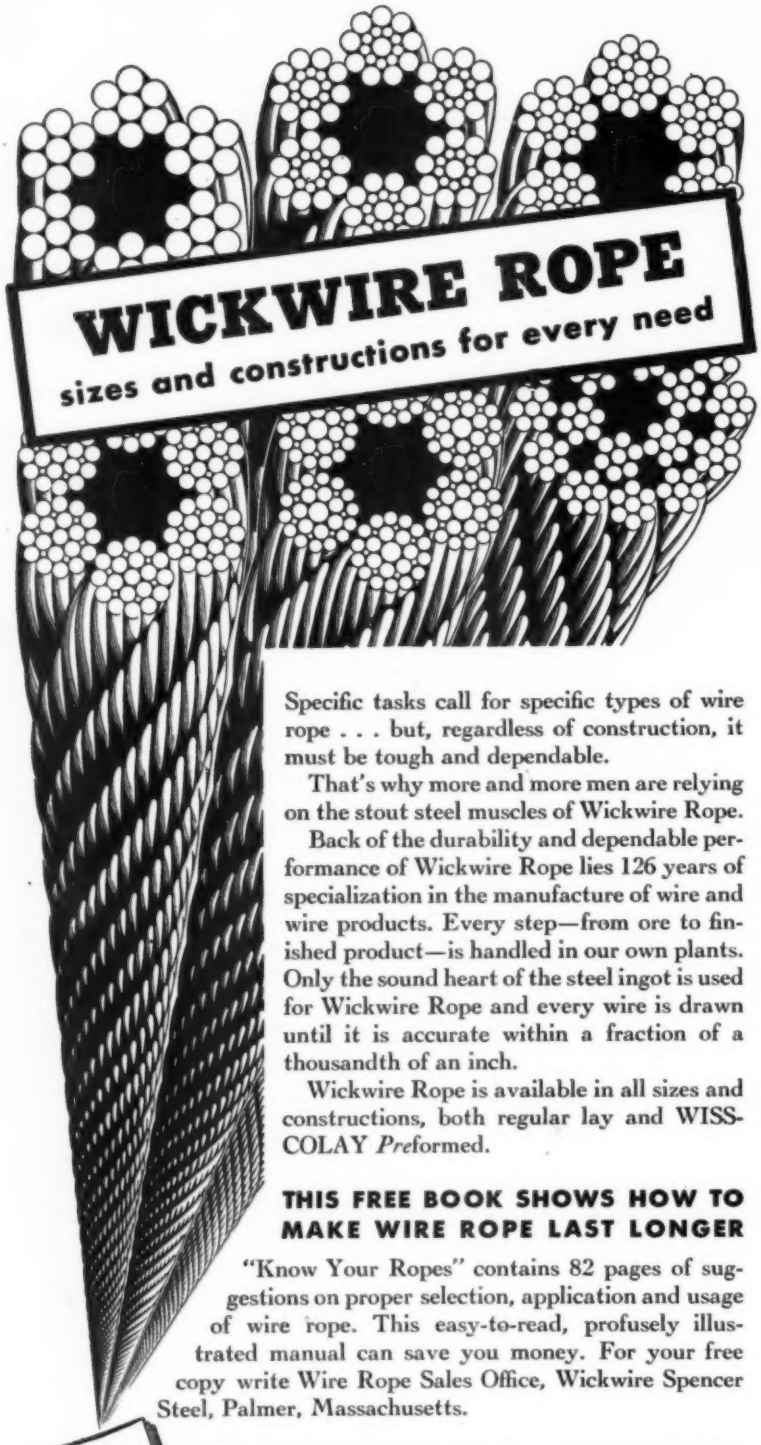


You can see for yourself in these photographs how the International TD-14 with a bull-dozer blade gets on with a basement digging job. Here the average distance from cut to spoil was 60 feet, depth to dig was 6 feet, yardage dug was 420 cubic yards of clay. Total time required was 6½ hours.

INTERNATIONAL HARVESTER

Industrial Power





Specific tasks call for specific types of wire rope . . . but, regardless of construction, it must be tough and dependable.

That's why more and more men are relying on the stout steel muscles of Wickwire Rope.

Back of the durability and dependable performance of Wickwire Rope lies 126 years of specialization in the manufacture of wire and wire products. Every step—from ore to finished product—is handled in our own plants. Only the sound heart of the steel ingot is used for Wickwire Rope and every wire is drawn until it is accurate within a fraction of a thousandth of an inch.

Wickwire Rope is available in all sizes and constructions, both regular lay and WISS-COLAY *Pre*formed.

THIS FREE BOOK SHOWS HOW TO MAKE WIRE ROPE LAST LONGER

"Know Your Ropes" contains 82 pages of suggestions on proper selection, application and usage of wire rope. This easy-to-read, profusely illustrated manual can save you money. For your free copy write Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Massachusetts.

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CF&I

SHOTS from the Firing Line

(Continued from page 146)

tion regarding structural steel might justify an exception in some cases. The PRA gives approval for the steel only, the contractor to furnish all other materials, and bids for construction work are called for only when delivery date of steel is established.

The subject of escalator clauses was laid on the table until the next meeting.

Harry J. Kirk, co-secretary of the committee, and manager of the A. G. C. Highway Contractors' Division, in response to inquiry concerning the A. G. C. manual, "Contractors' Equipment Ownership Expense," which is used widely as a basis for paying equipment charges, made the following explanations of the manual:

1. It shows "ownership expense," not "rental rates," as a percentage of the original capital investment, hence automatically the allowances are increased or decreased as the price of new equipment changes. From 1,200 to 1,500 items of equipment are covered.

2. The allowances are divided into three classifications:

(a) overhauling, major repairs, painting; (b) depreciation; and (c) interest, taxes, storage, insurance. They do not include ordinary field repairs, or operating expense for fuel, operation, etc., in practice charged to the job.

3. These allowances in percentages are "averages" and need modification for specific application to particular operations.

4. The "selected prices" shown in the current edition are of course out of date, but dollar prices of new equipment are most uncertain at this time.

5. Anyone having criticisms or definite data to support changes in the allowances shown is urged to submit them to the A. G. C.

Small and Large Jobs

It was generally concluded that highway departments should continue the present practice of adjusting the size of projects upon which bids are asked to the capacity of the contractors in their areas.

Opinion was practically unanimous that the 20 per cent limit in subtracting be retained.

As to the size of jobs, it was pointed out that time of completion under current conditions is dependent on delivery dates of critical materials, which might dictate that large bridges be separated from other work.

It is believed that the current federal-aid highway program with the sizeable allocation for secondary roads will embody adequate small jobs for small contractors, and that in the event of a lack of small projects, the large primary road jobs could be split into smaller units for bidding.

Points brought out in discussion of labor relations were: the conflict between state holidays and labor agreement holidays should be reconciled locally; "right to work" legislation re-

(Continued on page 154)

TWO GREAT NEW TIRES

The New EARTH-MOVER
For Free-Rolling Wheels
Where High Flotation is a Factor

It takes a tire with high deflection to get good flotation, to stand up and roll in soft ground.

The ability to *stand up and roll* when it's sticky is built into this newly designed, thoroughly tested General. It not only rides *higher,* but also rolls more easily, *uses less energy* from the power wheels.

Watch it work and you'll see more yards of dirt move faster. Watch it absorb obstructions that would bruise a hard tire. And, because it's tough, Top Quality throughout and built on General's famous shock absorber principle, it lasts longer.

TAMPING ACTION
Each notched square of the tread tamps down the dirt as it meets the ground, packs it hard; even packs the driving tracks where the tire follows the driving wheels. No surface disruption or distortion.

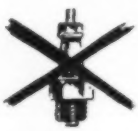
SNAG RESISTANT
Extra tough sidewall and tread resist cutting and snagging. Big margins of *plus* rubber content in the tread shoulder and sidewall armor the tire against sharp rocks and other obstacles found on construction jobs.

STRONGER BODY
An exclusive method of truck tire building allows General to put in more core cords of rayon in every inch . . . making the tire body much sturdier . . . much less subject to fatigue . . . much more flexible.

The GENERAL
TRUCK TIRE

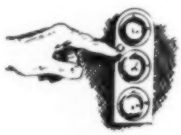
. . . AKRON 1, OHIO

I Never Knew Diesel Power Could be so Simple to Operate



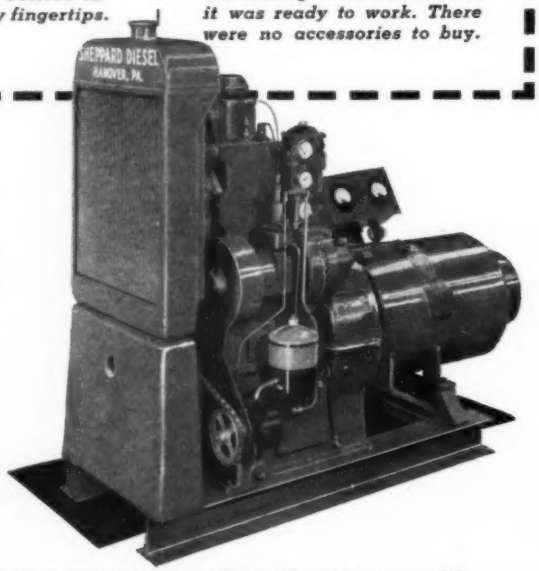
MY SHEPPARD *is a full diesel ... has no distributor, coil or spark-plugs that need attention and care. Rain won't stop it.*

THE SHEPPARD *Diesel operates and starts on common furnace oil, injected in a solid spray. There is no temperamental carburetor to adjust and maintain.*



I SET *the throttle ... push a button ... and my Sheppard is running. Dependable power ... free from all outside interference is at my fingertips.*

MY SHEPPARD *Diesel was delivered complete. I just put it in place, supplied it with fuel, lubricating oil and water and it was ready to work. There were no accessories to buy.*



Write for the illustrated booklet that completely explains many other outstanding advantages of Sheppard Diesel power units and generating sets.

R. H. SHEPPARD CO., INC.
44 Middle St., Hanover, Pa.

Sheppard DIESEL

Generating Sets—2,000 to 36,000 Watts • Power Units—3¼ to 56 continuous H.P.

DIESEL'S THE POWER . . .

Sheppards the Diesel

SHOTS from the Firing Line

(Continued from page 150)

cently effective in some states will inject a new element into negotiations when present contracts with unions terminate; union rules embodied in labor agreements in many areas control what labor the contractor may move from job to job.

Maintenance by Contract

Contractors expressed interest in maintenance work by contract.

Mr. Kirk reported that the Committee on the Economics of Highway Construction and Maintenance Methods of the Highway Research Board is gathering material on this subject as a special research project. Contractors and engineers with suggestions on this subject were urged to send them to Mr. Kirk or Hal H. Hale, A.A.S.H.O. co-secretary.

H. Morrison, Crimmins Get Annual Moles Award

The Moles, New York society of tunnel and heavy construction men, has nominated Harry W. Morrison, president of Morrison-Knudsen Co., Inc., of Boise, Idaho, to receive the organization's annual award to a non-member "for outstanding construction achievement."

Mr. Morrison was born on an Illinois farm in 1885 and went to work for Bates & Rogers Construction Corp., Chicago, in 1902, after finishing a business college course. He was associated with the U. S. Bureau of Reclamation from 1906 to 1912 and during that time obtained a degree in civil engineering from a correspondence school.

In 1912 Morrison and Morris Knudsen joined forces, thus establishing one of America's most successful contracting partnerships. The combination of contractors who built Boulder Dam under the name of Six Companies, Inc., was formed through the efforts of Morrison. The successful completion of that scheme set the pattern for various company combinations since that have built the great projects of the West and carried out so well the incredible construction projects at home and overseas during World War II.

At this time Morrison-Knudsen Co., Inc., with headquarters in Boise, Idaho, and branch offices in San Francisco, Los Angeles, Seattle and New York have projects under construction in China, in the Pacific, Alaska, Mexico, Afghanistan and Brazil, as well as many large jobs throughout the United States. All of these projects are directed by Morrison with the aid of capable project managers. Mr. Morrison takes a personal interest in each job and since construction is a passion with him he gets out in the field whenever possible. His concern for the welfare of all employees is inspirational and the men's loyalty to the "Boss" is traditional in the construction field.

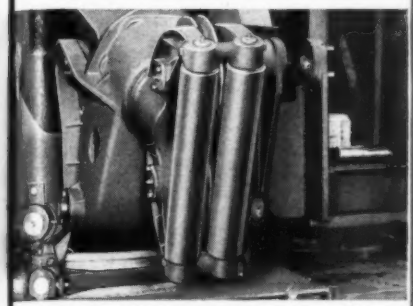
At the same time, The Moles nominated Thomas Crimmins, third-genera-

(Continued on page 158)

Profits cost low

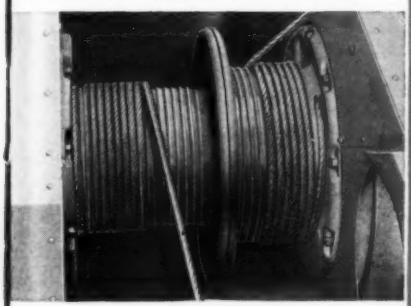
FAIRLEAD SAVES CABLE

With bucket at any angle, Koehring-patented rotating fairlead keeps drag cable running over big 15-inch sheaves. No cable wearing bends. Cable can't jump out.



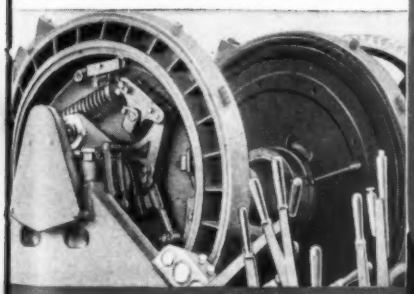
DRUM SAVES CABLE

Slack cable hugs drum grooving because drag cable spools over top of drum. 19-inch drag lagging has large cable capacity. Long lead from fairlead to drum.



CLUTCH SAVES CABLE

Koehring exclusive power clutches prevent shock loading, are easy on cable. You always get smooth engagement without jerking because speed of drum-shaft rotation controls speed of engagement.



MILWAUKEE 10, WISCONSIN

Johnson EXTRA TONNAGE at NO EXTRA COST

FASTER OPERATION

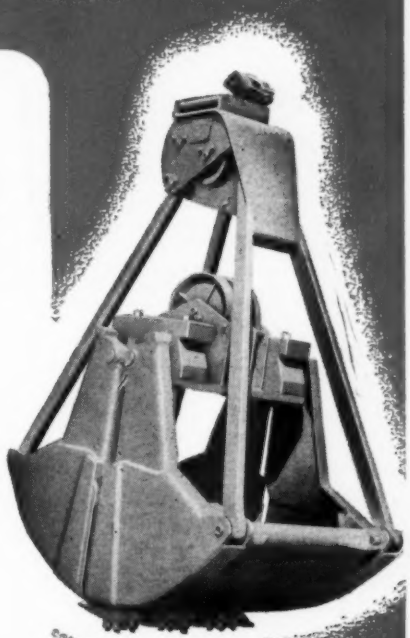
Large diameter sheaves, with fully sealed needle bearings, reduce friction power loss, deliver full power to cutting lips to provide faster, smoother operation.

BIGGER LOADS

Because all-welded construction improves bucket balance and lowers center of gravity, Johnson bucket teeth dig in straight and deep. Deep, big bites get capacity load every time, in any material.

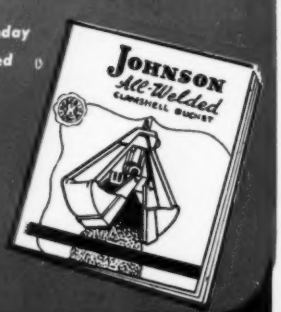
LONGER LIFE

Stronger and longer-lived because all-welded construction, by saving weight on other parts, permits use of heavier lips, heavier sides, heavier bottoms. Protector plate below lower sheaves keeps sheaves clean, prolongs sheave life. Hard manganese cutting edge, welded to heavy lips, actually gets tougher with use.



⅜ to 2½ yard sizes. General Purpose, Wide Rehandling and Heavy-duty Digging Type.

Write today for illustrated catalog.



THE C. S. JOHNSON COMPANY

KOEHRING SUBSIDIARY CHAMPAIGN, ILLINOIS

SMOOTH POWER Two-Cylinder

THE NEW ONAN AIR-COOLED

"CK" ENGINE 10 H.P. 4-CYCLE

Two-cylinder horizontal opposed design gives the new, heavy-duty CK engine unusual running smoothness. Short, rigid crankshaft . . . 2-inch diameter main and 1⅝-inch diameter rod bearings . . . pressure lubrication . . . axial-flow cooling fan . . . aluminum construction giving 4-to-1 cooling advantage over cast iron . . . weighs only 97 pounds and fits neatly into 15" x 19" x 18" space. Designed to solve engine power problems in industry, agriculture and other fields. Proven by thousands in use today . . . now in mass production . . . prompt delivery.

Also has: Built-in precision governor . . . downdraft concentric carburetor for wide-angle operation . . . oil bath air cleaner . . . fuel pump . . . oil pressure gauge . . . crankcase fumes exhausted to carburetor . . . hermetically sealed magneto ignition coil with easy-to-get-at breaker points, 2-qt. oil capacity.

ONAN ELECTRIC PLANTS—A.C.—350 to 35,000 watts in standard voltages and frequencies, D.C.—600 to 10,000 watts, 115 and 230 volts. Battery chargers —500 to 3,500 watts, 6 to 115 volts.

ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 h.p.; BH: 2-cylinder opposed, 5.5 h.p.; 18: 1-cylinder, 2.5 h.p.

WRITE FOR illustrated, complete specifications

Electric Starting

Built-in electric push-button or automatic starting is optional; adds little to overall dimensions.

D. W. ONAN & SONS INC.

3530 Royalston Ave. Minneapolis 5, Minn.

Onan PRODUCTS

ONAN 4-Cycle ENGINES

SHOTS from the Firing Line

(Continued from page 154)

tion member of the New York contracting firm bearing his name for this exclusive honor.

Presentation of citations and bronze plaques to Morrison and Crimmins was made at The Moles annual dinner in New York in February.

Give Status of Public Works Plan Preparation

Substantial progress has been made toward achieving a reserve of fully-planned state and local public works, ready to be put into construction when economic conditions warrant, according to a Federal Works Agency survey. It is being slowly increased through the concerted efforts of state and local governments and the federal government. In order, first to bring the shelf of state and local public works up to an adequate volume, and then to maintain it in adequate volume as a continuing reserve, the report concludes, continued planning will be needed.

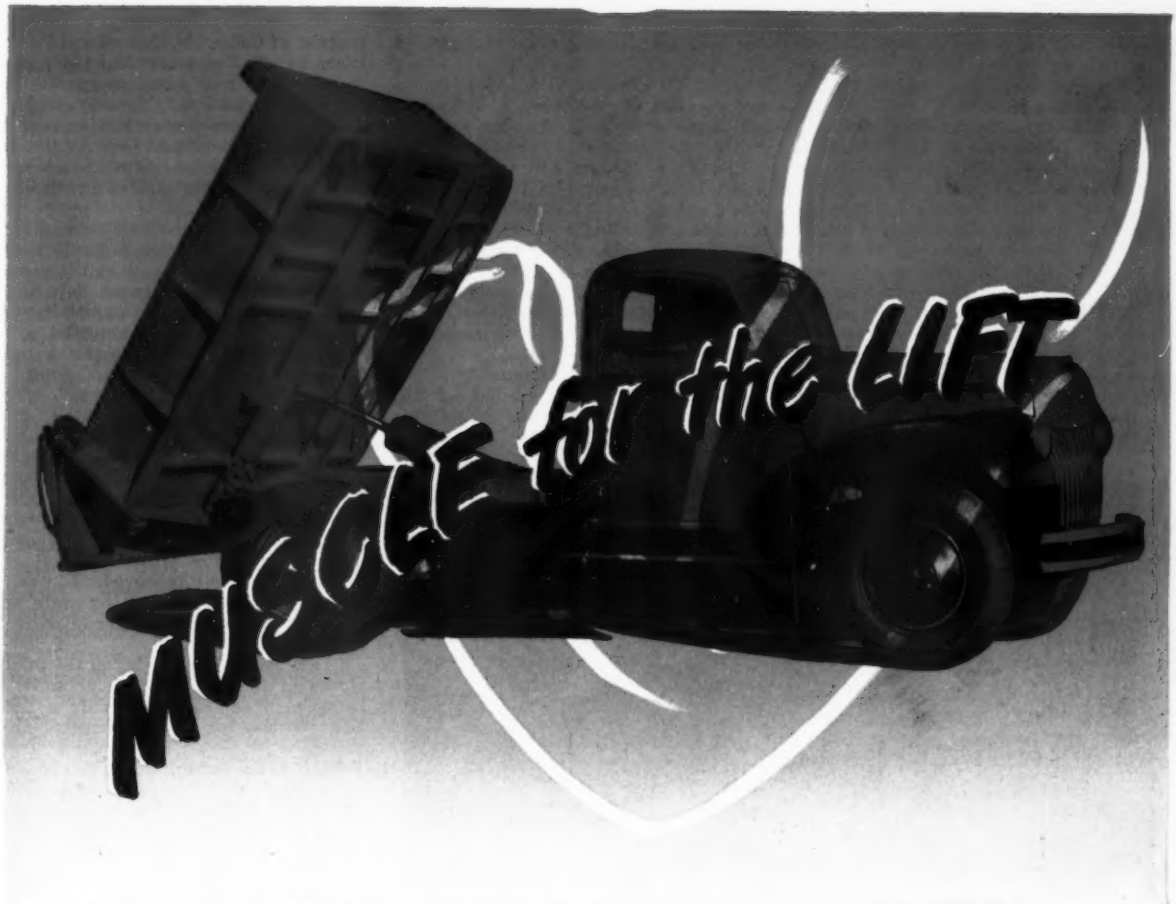
The results of state and local advance planning of public works, with and without federal assistance, are shown in the third semi-annual report of George H. Field, Commissioner of the Bureau of Community Facilities, FWA, which was made public by Major General Philip B. Fleming, Federal Works Administrator.

Through December 31, 1946, the report shows, under the advance planning program of the Bureau of Community Facilities, a total of $46,606,763 had been advanced to 3,231 different public bodies, ranging from state governments and major cities to counties, townships, independent school districts and other public agencies. These public bodies, located in every state, the District of Columbia, Alaska and Hawaii, are using the advances to finance the preparation of drawings and specifications for local public works with an estimated construction cost totaling $1,529,211,000 and an estimated total cost of $1,832,913,000.

Commenting on the report, General Fleming said:

"It should be emphasized again that advances made under this planning program must be repaid, without interest, when the projects so planned go into construction and more than a quarter of a million dollars so far advanced has been returned to the federal treasury. Since all the advances are recoverable, there is no ultimate cost to the federal government beyond the small sums required for administration."

Plan preparations completed without federal financial assistance through December 31, 1946, cover proposed state and local public works with estimated construction costs of $1,323,498,000 and estimated total costs of $1,581,260,000. The reported increase in completed plan preparations during 1946 was $538,827,000 and during the six months ending December 31, $197,709,000, both in terms of construction costs. A third of



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all planning completed without federal financial assistance is in New York State, compared with about half in that state a year ago.

In addition, without federal financial assistance, state and local governments have plans in the design stage for public works with an estimated construction cost of $4,124,009,000, but, the report says, the rate of progress in bringing these plan preparations from the design stage to completion has been slow. Programs of state planning aid to local governments have been set up in New York, California, Michigan, Illinois, Pennsylvania, New Jersey, Maryland and Indiana. Except for Indiana—which makes loans—these state planning-aid programs provide grants up to one-half the planning costs of approved projects.

Of 12,631 governmental units reporting on plan preparations without federal assistance, 7,438 had no plans in either the completed or the design stage. These included one state government, 1,601 counties, 3,470 cities, townships and towns, 2,235 separate school districts and 131 special districts. Most of the cities, townships and towns reporting no planning were of 10,000 population or less, but they included 273 with populations of more than 10,000, and of these, 28 are cities of more than 50,000 population.

The report also gives data from the Public Roads Administration, FWA, which show that in the 48 States, the District of Columbia, Hawaii and Puerto Rico, as of December 31, 1946, plan preparations had been completed for federal-aid and state highway projects with an estimated construction cost of $804,318,000, and plans were in the design stage for projects with an estimated construction cost of $1,926,521,000.

The dollar volume of all these different categories of proposed public works is not to be added together, the report points out, as they cover not only plans completed or assured of completion with federal aid, and plans completed without federal aid, but also plans brought to the design stage without Federal assistance, the completion of which is uncertain.

Remarking that "there is no occasion to turn to works of doubtful usefulness in building up a reserve," the report notes that sewer, water and sanitation facilities with schools and other educational facilities are leading the types of public works for which Federal advances have been approved. The same types also bulk large among state and public works thus far planned without Federal assistance.

"Yet," says the report, "all the public works of these types thus planned, or being planned, constitute only a fraction of those for which an urgent need exists.

"The same is unmistakably true at the present time for community facilities of all types—the recognized need vastly exceeds the volume of plan preparations. There is no thought of encouraging the planning of any but the most useful and needed public construction."

There will be large drains on the reservoir of fully-planned state and local public works in the near future, the report points out. Sewer, water, and sanitation facilities and schools and other educational facilities will be increasingly required, it predicts, to supplement the expansion of housing all over the country.

"A reserve of public works," the report notes, "cannot, of course, be held intact for emergency use. The reserve should be replenished as it is drawn upon by current construction."

Construct Three Dams On Single Project

For the first time in the history of the West, three large earth-and-rock dams are under construction simultaneously on a single reclamation development—the Columbia Basin Project of Eastern Washington, the Bureau of Reclamation reported.

They are the 3½-mile-long Potholes Dam, the 1,900-foot Long Lake Dam, and the 10,000-foot South Dam. In all, they will contain 12,190,000 cu. yds. of earth and rock, greater in volume than the 10,500,000 cu. yds. of concrete used in the Grand Coulee Dam and its two massive powerhouses.

The three new dams, said Bureau officials, represent contracts totaling $13,800,000 and are part of the com-

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prehensive system of irrigation structures designed to serve more than a million acres of dry land in the Big Bend region of the Columbia River. This area will be divided into from 12,000 to 15,000 family-size farms for veterans and other settlers.

Work on the South Dam, near Coulee City, Grant County, began last fall under a $2,771,000 contract granted the Bair-Crick Company of Spokane. Heavy earth-moving equipment started operating at the two other dams in the past few days, thus bringing the total under construction to three. A fourth large earth-and-rock dam, on which bids are yet to be called, is the North Dam in the Upper Grand Coulee.

The Boise firm of J. A. Terteling & Sons holds the $1,770,000 Long Lake Dam contract, and the firm of Lytle, Amis, and Green will build the $9,300,000 Potholes Dam, fourth longest in the United States.

Long Lake Dam, just north of Stratford, also in Grant County, will save nearly six miles of costly Main Canal construction, said Reclamation Commissioner Michael W. Straus. The Potholes Dam, blocking the Drummheller Channels, near the center of the Columbia Basin, will capture seepage and return flow from nearby irrigated land, thus reducing pumping costs at the project's main pumping station at the Grand Coulee Dam.

At the South Dam, which will block the Upper Grand Coulee to form a 27-mile storage reservoir for the irrigation project, the Bair-Crick Company is working on the foundation cut-off wall and completing excavation on the foundation for the two-mile structure.

At Long Lake Dam, Terteling & Sons are completing their camp and performing preliminary excavation for the foundation of the 1,900 foot barrier. At Potholes Dam, work has started on the foundation and outlet works. The outlet will be needed to carry away the flow of Crab Creek and other natural waterways during construction.

• Holes are drilled by Bucyrus-Erie 29-T blast hole drill in Newton County Rock Co.'s quarry six miles east of Kentland, Ind.

If contractors' schedules are maintained, the Long Lake Dam is to be completed by February 23, 1949; the South Dam by February 13, 1949; and the Potholes Dam by November 6, 1950. The Potholes Dam, by far the largest, will contain approximately 9,200,000 cu. yds. of material. The Long Lake and

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South Dams will contain about 1,500,000 cu. yds. each.

Dowell Becomes Head of Seattle Construction Co.

L. J. Dowell of Seattle resigned his post in January as public relations counselor for Pan American World Airways to become president of the Dowell Construction Company. Before joining Pan American, Dowell was active for 22 years in public works in Washington State and Alaska. He supervised the building of 600 miles of the Alaska Highway in Yukon territory.

Award Another Contract on Coachella Canal

Contsruction of another 7.8-mile section of the Coachella Canal in California, has been placed under contract for $697,724 by the Bureau of Reclamation. The contract was awarded to Otto B. Ashback & Sons, a partnership of St. Paul, Minn.

Eighty-seven miles of the canal have already been built, and construction of 29.2 miles is now underway. With the completion of this work, and the present contract, 124 miles of the 145-mile canal will have been completed.

The Coachella Canal is part of the All-American Canal System which will deliver Colorado River water to the Imperial and Coachella Valleys in southern California, Commissioner of Reclamation Michael W. Straus explained. A dependable supply of desilted water will stabilize the economy of the region and permit the development of new lands.

The section of the canal to be constructed is situated near Indio, California. Major items of the work include 290,000 cu. yds. of excavation for the canal and structures, 94,500 cu. yds. of compacted embankments and backfill, pouring of more than 10,000 cu. yds. of concrete in structures and canal lining, and placing more than 222 tons of reinforcement bars, and fabric, gates and gate hoists, and miscellaneous metal work.

Eight bids were received for the work. The construction must be completed within a year after the contractor receives notice to proceed.

• Working in the bottom of a granite quarry near Rolesville, N. C., this Heil cabledozer on an International TD-18 tractor moves big pieces of granite that have just been blasted. The quarry is operated by The Bryan Rock and Sand Co. of Raleigh, N. C.

Owen Heads Kentucky's Road Construction Division

Cabell Owen of Somerset, district engineer for the seventh district of the Kentucky Department of Highways has been elevated to director of the Department's Division of Construction with headquarters in Frankfort, J. Stephen Watkins, Commissioner, announced. Mr. Owen will succeed G. R. Logue who leaves to return to the Ohio Department of Highways as chief bridge engineer.

Consider New Hampshire Body for New Turnpike

A bill to create a three-member New Hampshire Turnpike Authority, to construct a $6,000,000 toll-financed superhighway across the state from Kittery, Me., to Newburyport, Mass, was introduced in the New Hampshire Legislature under sponsorship of Rep. Ernest A. Tucker of Rye.

A resolution introduced earlier by Rep. Ned Spaulding of Hudson called for creation of an interim commission to study the advisability of creating a toll road authority. Also previously introduced was a resolution providing for a committee to study the seacoast

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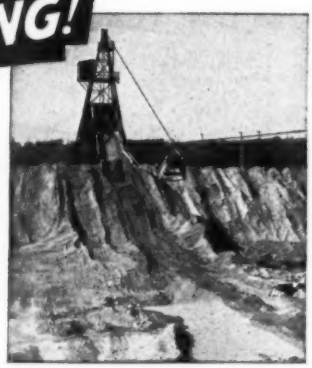

The picture shows a mobile Sauerman Power Scraper unit generally termed a Tower Excavator, digging a basin 350 ft. wide and 1400 ft. long. The bucket rides up a ramp attached to the head-tower and dumps the spoil into cars. The 4 cu. yd. bucket moves as much as 200 cu. yd. an hour.

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approach to New Hampshire to recommend road contsruction that would induce tourists to turn into the state at Portsmouth rather than to speed across the state from Massachusetts to Maine.

The Tucker turnpike bill would build for 19 miles through New Hampshire a road with two 24-foot traffic lanes on a right of way approximately 1,000 feet wide. The measure would create a turnpike authority with powers to acquire tax-free land and to issue long-term bonds. Representative Tucker said bonding companies had indicated their ability to finance the project and the state would not be asked to assume any of the bonded indebtedness for construction of the road.

The proposed New Hampshire turnpike would link with a $15,000,000 toll superhighway now under construction in Maine, running from Portland to Kittery.

Upon retirement of the bonds through toll collections, the proposed New Hampshire superhighway would be made a free public highway.

Oklahoma to Reorganize State Highway Board

Oklahoma's Legislature enacted a bill sought by Governor Turner to reorganize the state highway commission.

The measure provides for an eight-member, part-time commission to serve as the administrative and policy-making board with authority to make the program, let contracts and make rules and regulations for administration of the highway department. The commission will employ a director at a salary not to exceed $12,000 a year. He will be the chief engineer and executive officer of the department with the authority to administer it, subject to rules and regulations of the commission.

Oklahoma started with a one-man head of its highway department, later shifted to three, then tried five for a brief period, returned to the three-man commission, then took a four-man commission and returned to the three-man commission in 1939. The new reorganization law provides the first change in the highway commission's structure in eight years.

Col. Blakeley Joins Arba: Burton F. Miller Resigns

Harry E. Blakeley, Nashville, Tenn., became managing director, Highway Contractors' Division, American Road Builders' Association on March 1, replacing Burton F. Miller who resigned to be executive secretary of the Michigan Road Builders' Association, Lansing, Michigan.

AGC Branch Opposes Highway Fund Diversion

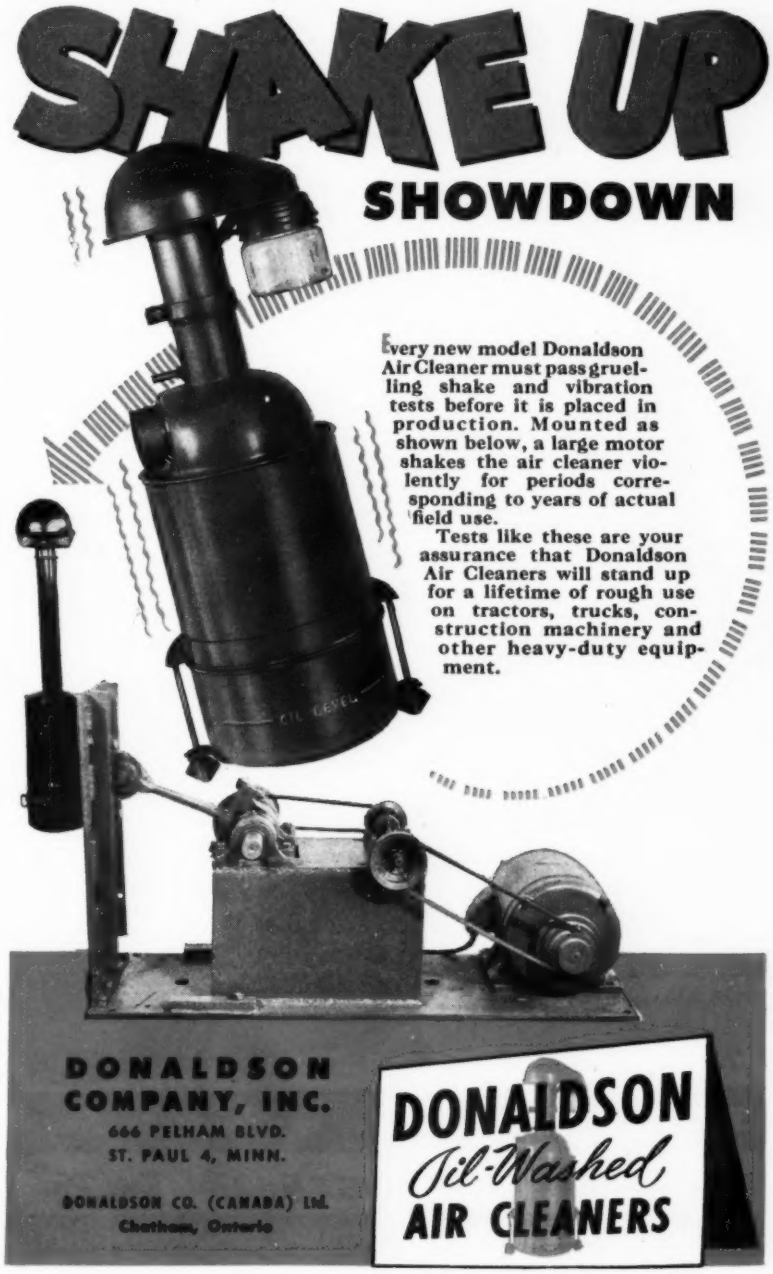
Through resolutions adopted at its annual meeting in Salt Lake City, the Intermountain Branch, Associated General Contractors of America opposed diversion of highway funds to non-highway purposes; advocated legislation to outlaw secondary boycotts and other unfair employe practices; urged city, county and state governments to use contractors for maintaining and constructing roads; supported an advertising program to publicize advantages of utilizing contractors, and committed the association to give additional funds to pay supervisors for a joint federal government-contractor-union apprenticeship training program for craftsmen.

Grant S. Thorne, Springville, of A. O. Thorne & Sons Construction Co., was elected president of the group, succeeding Ted C. Jacobsen. Ellis W. Barker, Salt Lake contractor was elected vice president, and G. Melvin Paulson of the Utah Construction Co. was named secretary-treasurer.

Named directors were Albert Whitmeyer, Ogden; Percival Young, Edward Clyde and J. P. Gibbons. Jacobsen automatically became a director.

Vermont Reports Roads in Fairly Good Condition

Vermont's public highways came through the war in fairly good condition but increased state appropriations must be provided now if vital improvements and deferred maintenance are to be financed, according to the thirteenth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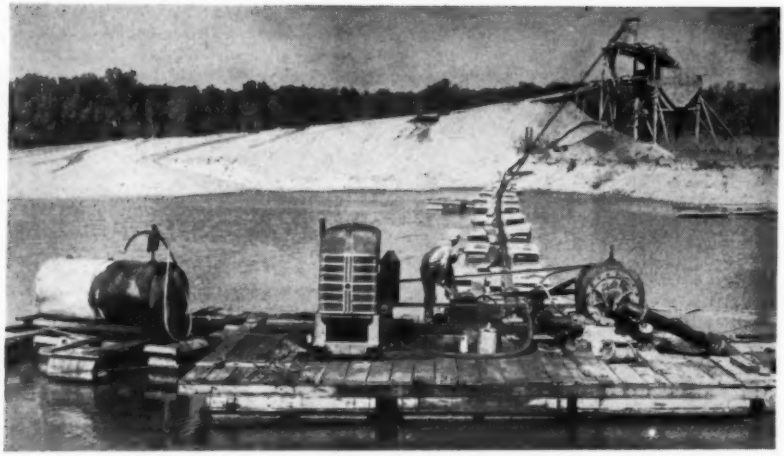

• A mud-hog with "floating power" is the efficient device used by the Paul Christensen Sand & Gravel Co. in their pit near Fremont, Neb. The "floating power" is a raft-mounted GM diesel engine driving a six-inch centrifugal pump to raise a mixture of water and sand from depths of 25 to 50 feet and force it through 180 feet to top of sand hopper on beach. The engine also provides power for the winch, which raises and lowers the mud-hog on the pit bottom. The company has pumped five years on this same location.

biennial report of the State Highway Board. This report covers the two-year period from July 1, 1944 to June 30, 1946.

According to the Highway Board, estimated deficits in state money available for matching federal aid funds will amount to $1,256,166.95 by June 30, 1948 and $2,918,461.70 by June 30, 1949 if additional state revenue is not provided. This does not take into account the accumulation of deferred maintenance or any construction other than federal aid work.

Detailed information on needed highway construction in Vermont, as presented by the Board in its biennial report, shows that in order to remedy present deficiencies the State should spend $7,923,000 on the town system, $11,401,000 on the state aid system and $66,135,000 on the state system during the next 25 years.

Inadequate bridges form a considerable portion of Vermont's present highway needs. On the state aid system, the board reports that there is such a backlog of bridge projects that the present annual appropriation of $100,000 will have to be at least doubled to provide the state's share for this work.

In connection with work on the town highway system, the state highway board emphasizes that more than ever it is necessary for towns to adopt efficient methods of planning. The following specific recommendations are made to towns:

1) That each town adopt a planned program of improvement designed to provide a gravel highway to every farm on the town system;

2) That the towns use for permanent construction at least 50% of the annual appropriation which they receive from the state for construction and maintenance of town highways.

3) That all town highway construction financed by the state be supervised by the state highway department just as is done with construction on state aid system.

Warn Oregon's Road Plans Threatened by Diversion

A warning that Oregon's state highway construction program is threatened by attempts of cities, counties and the state to dip into state highway funds was sounded by State Highway Commission Chairman T. H. Banfield after the commission heard a request from the Association of Oregon Counties for an increase from 15.7 to 20 per cent of funds allocated to the state's 36 counties.

Banfield cited a proposal that an additional $1,000,000 of state highway funds be transferred to the state police division as another example of attempts to divert funds from state highway construction.

Pointing out that the first year of the three-year $36,000,000 federal-state highway construction program calls for $1,500,000 more money than is now available, he added that highway maintenance costs have jumped from $500-$600 a mile in 1941 to $1,000 a mile at prevailing costs of $7,200,000 a year. It was further noted that construction costs are up 54 per cent.

Rock Debris at Kortes Dam Site to be Removed

The decision to remove a mass of talus or rock debris from the left bank of the spillway channel at the Bureau of Reclamation's Kortes Dam and Power Plant, now under construction in Wyoming, was announced today by Commissioner of Reclamation Michael

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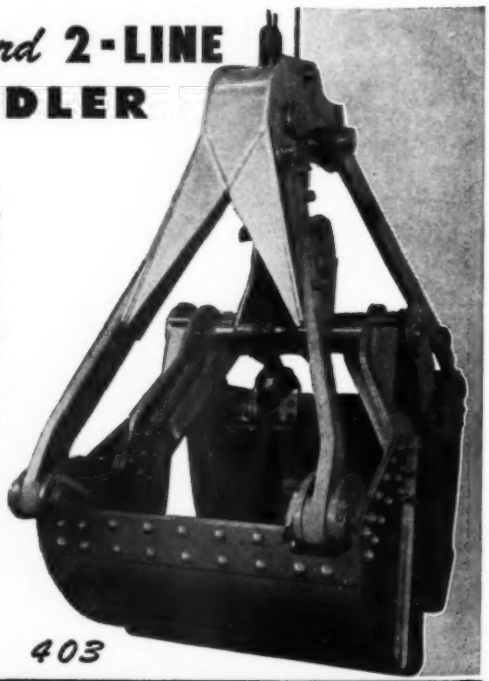

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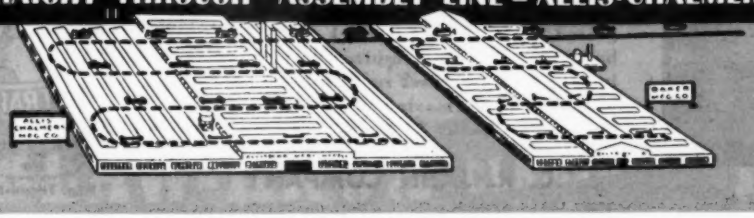

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W. Straus. The removal is necessary to prevent partial blocking of the improved channel by slides.

Construction of the dam and power plant is scheduled to be completed in 1949. The plant will have an installed capacity of 36,000 kilowatts, provided by three 12,000-kilowatt generators.

Approximately 80,000 cu. yds. of talus will be removed by the Morrison-Knudsen Company, Inc., of Boise, Idaho. This additional excavation will cost approximately $240,000.

Virginia Has $7,000,000 Spring Road Program

Tentative plans for a record $7,345,920 spring road-building program, were announced by the Virginia Department of Highways.

Included in the proposed list of 12 major projects was a modernistic "triple-decker" bridge structure in the congested Norfolk area, the Richmond area's first "clover-leaf" intersection overpass, and a "million dollar plus" bridge to span the western branch of the Elizabeth River near Portsmouth.

The program, much of which is in the "planning" stage and awaiting a final go-ahead signal, also calls for at least 82 secondary system projects, all of which should be ready for advertising by early spring.

If the entire program goes through, it will be by far the largest contract letting in Virginia highway history.

Need $80,000,000 Yearly to Improve Carolina Roads

Expenditure of $80,000,000 annually for the next ten years will be necessary to bring the highways of North and South Carolina "up to standard," it was estimated by members of the Carolina Road Builders Association at their recent annual meeting in Columbia, S. C.

Officers of the association were re-elected as follows: President, E. H. Hines of Greenwood, S. C.; vice president, J. W. Thompson of Greensboro, N. C., and secretary, Warren Mann of Raleigh, N. C.

Members of the executive board are Gregory Poole, Raleigh; T. R. McMeekin, Cheraw, S. C.; K. Sloan, Fayetteville, N. C.; Sam Dreyfus, Columbia; Walter Smith, Charlotte, N. C.; Charles Ross, Lillington, N. C.; Nello L. Teer, Jr., Durham, S. C., and C. P. Ballenger, Jr., Greenville, S. C.

Dr. Bowles Retires from Bureau of Mines

The retirement of Dr. Oliver Bowles, Chief of the Nonmetal Economics Division of the Bureau of Mines, after 33 years of Government service, was announced by Dr. R. R. Sayers, Bureau Director. Internationally known for his pioneer achievements in the field of nonmetallic minerals, Dr. Bowles plans to devote his time to writing, consulting work, and to his hobby of flower culture.

Stewart Heads Kansas Contractors Association

Edgar C. Stewart of Wichita was elected president of the Kansas Contractors Association at the opening session of the annual two day meeting in Kansas City.

M. Clare Miller of McPherson was elected vice-president, and C. L. Burt, of Hutchinson, was named treasurer. Chosen for the executive board were: Ralph H. Rhoades of Newton; Grant A. Stannard of Wichita, M. W. Watson of Topeka, and E. W. Gieger of Leavenworth. J. W. Ballard, and Miss Martina Hyatt of Topeka were appointed to continue as secretaries of the association.

Expect New Construction to Meet $15 Billion Goal

The outlook is favorable for the nation's construction industry to meet its 1947 new construction goal of $15 billion, 50 per cent more than in 1946, according to John L. Haynes, Chief of the Construction Division, Department of Commerce. During 1947 an estimated one million new permanent dwelling units should be started.

In addition to the $15 billion in new construction, it is estimated that from $6.5 to $7 billion will be spent in repair and maintenance. This would make the year's grand total of construction ex-

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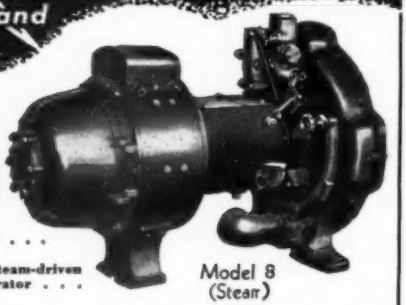

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penditures close to $22 billion, Haynes said.

He emphasized that the 1947 construction outlook is based on the assumption that increases in the cost of construction will be moderate in 1947, and that any increases in the materials price index and labor rates will be in part, at least, offset by the increased volume of building materials called for by the 1947 Government program and the possibility of more normal operations; that present remaining controls on nonresidential construction will be eased; and that there will be no general business recession in 1947 severe enough to impede construction.

In presenting a detailed breakdown of the Department of Commerce 1947 construction estimate, Haynes said that by far the largest amount spent in any one category will be in private residential construction which is expected to total $6 billion, not counting farm homes. This should permit the starting of approximately one million private permanent dwelling units and the completion of approximately 900,000. In 1946, 675,000 units were started and about 450,000 were completed.

Private construction will make up the bulk of the year's new construction total, amounting to $11.7 billion, or 49 per cent more than for 1946. Public construction will total $3.4 billion, an increase of 50 per cent over 1946.

During 1947 the outlook is for substantial gains in all types of construction, both public and private—except in three categories. These categories are public residential construction, which is expected to decline by nearly one-half from the 1946 level to a total of $200 million; public industrial, which will probably decline about one quarter to a total of $60 million, and military and naval construction, which will probably decline 19 per cent to a total of $150 million.

During the year there will be large increases in the construction of sewer and water systems, highways, school buildings, hospitals and other public institutions, as compared with 1946, Haynes said. Approximately $1.6 billion will be spent on new highways and $375 million on sewer and water systems, in both cases nearly double the amounts spent in 1946. About $225 million is expected to be spent on school buildings, up 123 per cent; and $215 million on hospitals and other public institutions, up more than 150 per cent.

Private nonresidential building is expected to total almost $4 billion in 1947. The relatively small increase from 1946 of only 17 per cent is attributable to the delayed effects of the restrictions which were instituted in March.

Rhode Island Asks Funds For Three New Airports

Applications for federal aid for the construction of three new airports in Rhode Island were recently signed by Laurance J. Hogan, chairman of the Rhode Island Commission on Coordination and Execution of Postwar Programs.

Assistance from the $1,036,577 to be available to Rhode Island under the federal-state airport construction program was asked to provide fields in the Smithfield-Lincoln area, at Newport and on Block Island.

It was disclosed by the application that the new Smithfield-Lincoln field, now called the North Central State Airport, eventually will be a Class III field, with a final cost estimated at $3,727,800.

The proposed Newport field, also planned to accommodate large planes, will cost an estimated $1,643,500 while a Class I field costing $201,120 is envisioned for Block Island.

PRA Approves Ohio's 1947 Federal-Aid Road Program

Ohio's original 1947 (second post-war year) Federal-aid primary highway program has been approved by the Public Roads Administration, it was announced by State Highway Director Perry T. Ford.

Two of the projects submitted by the Highway Department were not approved, pending further discussion. The approved program includes one statewide Highway Planning Survey project and 18 construction projects, with a total estimated cost of $9,283,748. Of this amount, the PRA will furnish

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• Moody White, Statesville, N. C., uses his Bucyrus-Erie 3½ cu. yd. two-wheel scraper in the construction of a small lake east of Statesville.

$4,620,748. Of the Federal funds, $202,350 is for three railway-highway projects.

Plans for these projects are underway, Director Ford said, and the Highway Department hopes to have them ready for sale by the time the Legislature provides matching funds. The jobs were programmed before state funds were available so that Ohio would not lose its share of the Federal Post-War Highway Program funds.

A total of $7,893,255 Federal funds are available for 1947 Federal-aid primary highways. Additional 1947 primary projects to use up the full amount of Federal-aid money are under design but were withheld from the program until it is determined that price trends will allow their accomplishment within the allotted funds.

In addition, sufficient alternate projects are under design to allow substitutions for the PRA-approved projects in the event some critical materials, such as structural steel, are required, and which might not permit award of contracts prior to lapse of Federal-aid funds.

"In other words," Ford said, "the Highway Department has done everything necessary to make sure Ohio does not lose a single penny of the Federal-aid money coming to it under the three-year Post-War Highway construction program."

PRA also has approved addition of four projects to the 1943 Federal-aid grade crossing program, the director announced.

Ask for Better Farm Roads in West Virginia

A five-year program calling for expenditure of $100,000,000 to improve West Virginia's secondary roads will be sought during the 1947 session of the West Virginia Legislature.

Leland Booth, secretary-treasurer of the West Virginia State Farm Bureau, announced that the proposed program was approved at a recent meeting in New Martinsville by leaders of his group from seven Ohio Valley counties.

"Despite huge expenditures for better roads to the cities in recent years," Booth said, "fully 48 per cent of West Virginia's farm population still live on dirt roads. These unimproved roads represent an unfair hazard for the farmers and prevent the full utilization of their property."

Booth said the Farm Bureau's road improvement plan had been drafted after a series of conferences with State Road Commissioner E. L. Worthington. "The plan," Booth added, "has met with Worthington's approval and the appropriation of the necessary money must come from the legislature."

Urge Utah Road Costs Be Met from Highway Funds

All highway costs in Utah, local as well as state, would be met by highway revenues under a recommendation included in the final report tentatively adopted by a state legislative interim tax study committee.

Prepared for submission to the 1947 Utah Legislature, the report also recommended that Utah issue bonds for state highway construction as soon as it is considered expedient to go into an extensive program.

15 Years and $20 Billion Needed for Our Highways

A planned program of 15 years and from 16 to 20 billion dollars will be required to modernize our present system of streets and highways, according to Charles M. Upham, engineer-director of the American Road Builders' Association.

The condition of many roads in the United States is a casualty of the war. More than a million miles of rural roads and 95,710 miles of state-controlled highways lack all-weather surfaces and some 75,000 miles of city streets and alleys lack year-round surfaces of concrete, asphalt, tar coating or gravel.

"With motor vehicle accidents costing 1¼ billion dollars a year, and modern highway design demonstrably able to cut accidents significantly, the cost is not high and the benefits are immeasurable," Upham said. "In New Jersey, recent changes in engineering design reduced accidents by 76 per cent."

The need of modernized roads is further shown to be vital when we consider that 49 large cities of the country get all their milk by highway, that 54 per cent of our livestock is hauled by road, and that small business firms ship nearly half their freight by highway, according to Upham.

"Moreover," the Road Builders' executive said, "rural education and the quick availability of medical attention find a modern highway system an important factor."

Highways wear out. Eventually they require extensive repairs, sometimes relocation, in addition to routine maintenance. New types of motor vehicles and increased traffic make changes necessary in both design and construction.

In 1943, a survey showed that 121,000 miles of roads required widening or rebuilding. The estimated cost was $3,800,000,000. The relocation of 36,000 additional miles to cost $2,418,000,000 brought the total cost of rehabilitating obsolete highways to $6,218,000,000. To this, the survey showed $810,000,000 needed to be added to widen or rebuild 30,000 bridges.

"This mid-war stock-taking of badly needed improvements for our roads

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called for an additional expenditure of $11,138,000,000 including the federal-aid system, the secondary federal-aid system and the urban highway system. The total cost, therefore, for highway extensions and for the wiping out of out-of-date features amounted to $18,-168,000,000 three years ago. With little new construction and insufficient maintenance since that time, it would require approximately 20 billion dollars to enable our highways to meet present transportation demands," Upham stated.

Bottlenecks of materials, machinery and construction are obstacles at the moment. But with the hoped-for highway program of $750,000,000 for 1946, construction under contract should reach a peak of two billion dollars a year by 1949. After that, it would require at least ten years to complete the job.

Study Travel Habits

Studies of travel habits are now in progress in the metropolitan areas of 37 large cities in 22 States. They are being made cooperatively by the highway department of the affected State, city authorities, and the Public Roads Administration. In six of the cities additional studies are being made of parking conditions to supplement the information obtained on travel habits. The purpose of the studies is the development of facts needed in planning a solution of traffic problems.

Submit Plans for Cross Town Expressway in N. Y.

Preliminary plans for the construction in 1948 and 1949 of a $22,300,000 lower Manhattan crosstown expressway were submitted to Mayor William O'Dwyer by City Park Commissioner Robert Moses, city construction coordinator, and Hugh E. Rogers, Manhattan borough president.

To carry six lanes of mixed passenger and truck traffic on an elevated structure linking the city's West Side Highway with the Holland Tunnel and the Williamsburg and Manhattan bridges, the project is planned as the first of what will ultimately be a series of east-and-west crossings in Manhattan to connect with new marginal north-and-south drives, parkways and under-river traffic tunnels.

It is planned in connection with the project to build a large parking garage for passenger cars and trucks at a point near the intersection of the main expressway with the Manhattan Bridge spur. It also is planned to provide parking space under the elevated structure at various points along the route.

$50 Million in Contracts Awarded in Northwest

The Bureau of Reclamation awarded major contracts totaling $50,000,000 in the Pacific Northwest during calendar year 1946—one of the largest work programs ever undertaken by the organization in a single year—Acting Director J. Lyle Cunningham said.

Funds available for expenditure in the region during this period exceeded $60,000,000, which includes current and prior years Congressional appropriations, he said. At the end of the year, work was proceeding on most of the contracts let in 1946.

Major activities included starting construction of irrigation facilities on the million-acre Columbia Basin Project, completion of the 45,000-acre gravity unit of the Roza Division of the Yakima Project, and initiation of construction of the 27,000-acre pumping unit, beginning of construction of Cascade Dam of the Boise Project in southwestern Idaho, virtual completion of the embankment for Anderson Ranch Dam of the Boise Project, initial delivery of water to the 50,000-acre North Unit of the Deschutes Project, completion of the 3500-acre Post Falls unit of the Rathdrum Prairie Project in northern Idaho, pre-construction work looking to early building of Palisades Dam in southeastern Idaho and Hungry Horse Dam in northwestern Montana, production of more than four billion kilowatt-hours of hydroelectric power at Grand Coulee Dam and in nine other Federal powerplants, and

(Continued on page 172)

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"Why did you have 764578 tattooed on your back?"

"That's no tattoo. That's where my wife hit me with the car while I was holding the garage door open."

They were having just one more at the bar when an old friend, previously quite normal, came through the door, walked up the wall, across the ceiling, down the other wall, and disappeared through the back door.

There was a moment's stunned silence, then: "What in the world's got into that guy!"

"Yeah, he didn't even speak to us!"

Bridegroom: "This steak has a queer taste."

Bride: "I can't understand it. I burned it a little, but I immediately rubbed it with vaseline."

MacTavish: "I smoke quarter cigars!"

O'Flarity: "Yeah, who smokes the first three-quarters?"

Mistress: "When you wait on the table tonight, please don't spill anything in front of my guests."

New Maid: "Don't worry, Ma'am. I don't talk much."

"My husband is one man in a hundred."

"How do you manage to keep him from knowing it?"

A sailor, just home from a long cruise, rushed to a phone and called his girl friend. In a few minutes he came out of the booth looking very bewildered.

"She's gonna get married," he told a pal.

"Aw, forget it," advised the pal. "There's lotsa girls."

"Yeah," replied the sailor, "but she's gonna marry me."

"The best thing to do, Mabel, is simply ignore them!"

A bachelor met a girl at a dinner party and fell in love with her at first sight. During the course of the evening he was staggered by the extent and variety of her many accomplishments. Obviously the girl of his or anybody else's dreams, he told her so, in detail, all the way home in the taxi. At her door, just before bidding her good-night, he took her key and opened the door for her. There, in her living room, was a dead horse. The man stared at it aghast. "Well," said the girl of many virtues and accomplishments, "I didn't say I was neat, did I?"

After an evening in a local night spot, a gay party at one of the tables arose to leave. Beckoning a waiter, one of the men asked, "Is it raining outside?"

"Sorry," replied the waiter coldly, "this isn't my table."

"I'm sure my husband is unfaithful to me," she moaned, "because not one of the children looks in the least like him."

"What's the idea of kicking my dog? He won't bite you!"

"Maybe not, but he raised his leg and I thought he was going to kick me."

Manager to Models: "Now, girls, remember when you sit down, assume the 'Prodigal Pose' —that's the one that brings out the fatted calf."

An invitation to dinner had been sent to the newly-settled physician. In reply, the hostess received an absolutely illegible letter.

"I must know if he accepts or refuses," said the wife.

"If I were you," suggested the husband, "I would take it to a druggist. They can always read doctor's prescriptions, however badly they are written."

The druggist looked at the slip of the paper, went into his dispensary and returned in a few minutes with a bottle.

"There you are, Madam," he said. "That will be seventy-five cents."

Moving a Mountain

(Continued on page 136)

the water near the fill. The excavated mud was loaded into end-dump trucks and hauled to a place where deep water comes close to the shore of the airport, where the trucks backed up onto planks and dumped.

Use of bottom-dump trucks greatly reduces the work of spreading loads. Earth wagons opening sideways form a ridge of uniform height, while the clam-shell dumping type hauling units make a wider, shorter fill, scraped level on top.

Sheepsfoot rollers do a quick job of compacting successive layers of material. A large pile of dirt is dumped beside each grade stake, to keep the latter from being run over by equipment. Aircraft, including four-motored passenger planes, arrive and depart at the rate of 300 a day—one almost every five minutes. When a stiff breeze blows from the nearby ocean, some airships taxi out to the edge of the landing-field, in order to gain altitude by taking off against the wind.

Would it not have been cheaper to use a conveyor-belt, similar to the one which transported gravel to Shasta dam, for conveying fill material from borrow pit to airport? Gravity would have furnished free power for operating the equipment. Contractors point out that belt-conveyed material must be of approximately uniform size, also that a suitable belt was not available when the contract was let last April and, if ordered then, would not have been delivered for more than a year.

Macco-Morrison-Knudsen have a third big job lined up in the same location—relocating five miles of the Bay Shore highway near the airport, a $3,000,000 operation made necessary to provide additional space for the landing-field. The same borrow pit and access road used on the airport fills will be employed on the highway project, reducing the expense of all three jobs.

When the present source of material has been exhausted, the land—formerly too steep for residential purposes—can be sold for homesites, the ravine in the center having been filled with overburden, hills leveled and a branch highway built to connect with El Camino Real, arterial thoroughfare. All of which indicates foresight and good judgment on the part of the contractors.

Assisting Project Manager Tucker on the job are George Haensel, project superintendent; Lex Hobson, master mechanic; Ray Blanchard, assistant in charge of shovels; Byron Doherty, day shop foreman; Buck Avery, swing shift foreman; Carl Schrupp, graveyard shift superintendent; Mickey Daley, night superintendent; M. E. "Pappy" Schmidt, pit foreman; H. E. "Whitey" Stanton, foreman on the fill; A. J. "Buck" Hope and Robert "Smokey" Sutherland, swing and graveyard shift foremen; Andy Cathey, compaction and sub-grade foreman; Trace Baker, truck foreman; Bob Slater and Kenney Hayes, swing and graveyard shift truck foremen; F. F. Smith, drilling foreman, and A. W. Rollman, powder foreman.

The project office force includes Eugene Hargraves, office manager; David Richards, cost engineer, and Eddie King, equipment clerk.

Snow Removal

(Continued from page 138)

road is concrete or bituminous surfaced, or is of gravel or stabilized earth. Consequently, snow affects both the primary and secondary highway systems, and the farm-to-market roads as well. After a heavy snowfall, its removal from roads is necessary. Actual snow removal is an expensive process in equipment, chemicals, manpower, and in its wear and tear on various surfaces.

It's "beautiful snow," but very expensive snow and the pictures on these pages are of typical heavy snowfalls and blizzards in various parts of the country with their attending blockade of roads and streets that work hardships on millions.

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SHOTS from the Firing Line

(Continued from page 169)

production of huge quantities of food and other crops on 14 irrigation projects.

The dollar value of construction contracts awarded by the Bureau in 1946 by projects was: Columbia Basin, $42,897,141; Roza Division of the Yakima Project, $1,191,505; Hungry Horse Project, $1,453,098; Boise Project, $4,125,476; Deschutes Project, $602,832; Palisades Project, $102,342; and Missoula Valley Project, $232,707.

Ask 21 New Airports Be Built in New Jersey

Recommendations for the construction of 21 new airports and improvement of 14 existing fields in New Jersey were made by the State Aviation Commission in a report of a survey designed to pave the way for New Jersey participation in the federal airport program.

It was estimated that there will be 10,380 airplanes owned and operated within New Jersey by 1950. As of last Oct. 15, there were 84 airports and 1,001 aircraft in the state. There were 98 commercial operators.

To qualify for $7,000,000 of federal funds available to New Jersey for airport development in the three years ending in 1949, the state, counties or municipalities individually or collectively must match the federal funds. While the method of financing the half of the construction costs which must be borne within the state was not discussed in the report, sentiment is said to be growing among New Jersey aviation officials that the state should accept 50 per cent of the responsibility.

Walpole Heads Oklahoma Chapter of AGC Group

E. H. Walpole of Oklahoma City, has been installed as the new president of the Oklahoma chapter of the Associated General Contractors of America. Other officers installed were: W. R. Grimshaw of Tulsa, vice-president; R. E. Mattison of Briton, 2nd vice-president; Walter Nashert of Oklahoma City, treasurer, and H. R. Jensen of Oklahoma City, secretary.

North Carolina Reports $27 Million in Roads

In a report on the first year of North Carolina's postwar highway improvement program, the State Highway and Public Works Commission revealed it had let $27,760,909.52 in contracts for surfacing, repair and grading of 2,112 miles of road work since July, 1945, in addition to work carried out by division and district highway forces.

Figures on repairs and improvements completed during the period by the state road gangs were not immediately available, but commissioners said the total mileage would run "at least double" that handled by contractors.

Commission Chairman A. H. Graham said that $11,054,285 of the contract work was spent on regular federal-aid projects involving 248.96 miles; $5.973.505 for 295.86 miles of federal-aid projects on secondary roads; $318,640 in federal-aid projects for improvement of 1.75 miles of grade crossings; $38,540 for .188 miles of urban improvements; and $275,900 for 5.37 miles of forestry roads.

A total of $2,788,905.82 was spent in retreatment contracts on 747.043 miles of state primary and secondary roads; $438,672.01 for retreatment of 116.67 miles of county roads; $1,589,066.92 for betterment project contracts on 199.77 miles of state roads; and $5,282,854.77 for betterment of 496.66 miles of county roads.

Appoint John Bliss New Mexico State Engineer

John Bliss, engineer for the Interstate Streams Commission, has been appointed New Mexico State Engineer to succeed Thomas M. McClure who died recently. Bliss has been with the engineers office for 20 years and had served as assistant state engineer before taking the position as engineer to the interstate streams commission.

American Firm Works on Water Project in Venezuela

The American firm of Groves, Drake and Co., which recently finished $4,500,000 worth of work on the Maracao river dam in Venezuela, is now working on purification plants for the project at Las Adjunatas. It is part of the new water system for Caracas, city of 500,000 persons.

Start Work on St. Louis Airport Improvements

Start of construction on two improvement projects costing $1,264,000 at the Lambert-St. Louis Municipal Airport was announced by John Randolph, manager.

Grading was started for a new 4,100-foot concrete runway, part of which will be built on newly-acquired land southwest of the administration building. The Fred Weber Jr. Construction Co. is doing the work under a $752,000 contract. A drainage system is being constructed by G. L. Tarlton, Inc., at a cost of $512,000.

Connecticut Plans for a $2,000,000 Highway

Connecticut's State Highway Department has mapped plans for a $2,000,000, two and four-lane highway, connecting East Hartford and Glastonbury, to relieve increasing traffic congestion on Route 15. State Highway Commissioner William J. Cox has emphasized that the project is contingent upon the amount of revenue made available to his department by the 1947 Connecticut Legislature.

Modernize Principal Street of Caracas

Eduardo Mier y Teran, minister of public works for Venezuela, announces that work will begin within 60 days on modernizing Avenue Bolivar, one of the principal streets of Caracas, the capital city. Approximately $3,500,000 will be spent to make the avenue one of the finest in Latin America, according to the minister.

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WITH A front end that means business, with a revolving frame that affords a real backbone for tough digging, and with 3-motor drive and full Ward-Leonard control, the Bucyrus-Erie 2½-yard 54-B has both the strength and the speed needed for many years of high-speed loading and stripping service. Easily converted to dragline in the field, the 54-B is "years ahead" because its design is based on a scientific analysis of the work it must do.

17 L-60C

BUCYRUS-ERIE COMPANY • South Milwaukee, Wis.

A SPECIAL 4-yard coal dipper plus 54-B efficiency means outstanding speed on this coal-loading operation.

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For Sustained High Production at Low Cost

Notes from the manufacturers

Sauerman Bros., Inc., Chicago, announces the appointment of Martin Meyer as assistant sales manager. He will aid D. D. Guilfoil, general sales manager, in the department.

International Harvester Company's Melrose Park plant near Chicago was the scene of one of the largest industrial equipment exhibits ever presented by the company. In addition to International's complete line of tractors and engines, 32 other manufacturers displayed machines using International power. Dealers, distributors and manufacturers who attended the February 12 exhibit were addressed by the following International industrial power division officials: H. T. Reishus, general manager; Neal Higgins, sales manager; W. M. Parrish and G. A. Gilbertson, assistant sales managers.

M-R-S Manufacturing Co., Flora, Miss., has acquired a new and larger site for manufacturing purposes and has moved its offices and plant from Jackson to Flora where it has secured a part of the Mississippi Ordnance plant.

Koehring Co., Milwaukee, Wis., announces that J. A. "Jack" Miller has joined their sales staff. He will work with Koehring distributors in the North Central states.

Le Roi Co., Milwaukee, Wis., announces the purchase of the Cleveland Rock Drill Co., Cleveland, Ohio. Included in the purchase were the manufacturing rights to all of the line of rock drills, the jigs, dies, fixtures, patterns, etc. Russ Morgan will head the expanded facilities and J. M. Dolan, vice-president in charge of sales, will supervise the integration of sales activities of all Le Roi products from the company's headquarters at Milwaukee.

Beckwith Machinery Co., Pittsburgh, Penna., announces that Rexford L. Eaton and Albert S. Gerlach are now serving as salesmen handling the Beckwith lines of construction machinery and road equipment. Gerlach will work in the Lancaster, Lebanon, and Harrisburg areas while Eaton will cover the Mifflin, Lewistown, and Huntington region.

Buffalo-Springfield Roller Co., Springfield, Ohio, announces the retirement of Mr. W. H. McClenen, central district sales manager. Replacing Mr. McClenen will be Mr. J. P. Griffin, who for the past several years has been the western district representative for the company.

R. G. LeTourneau, Inc., Peoria, Ill., announces the creation of an Export Division, under the direction of Paul E. Fulford, which will conduct all export functions including sales, service, credit, collections, etc. The new division will be located in New York City and will be staffed with the following personnel under Mr. Fulford's direction: Paul M. King, assistant manager in charge of sales; L. L. Petefish and R. P. Nichols, assistant sales manager; E. P. Sandmeyer, credit manager; Willard Arnold, office manager, and George Rosewall, traffic manager.

The Euclid Road Machinery Co., Cleveland, Ohio, has promoted W. W. Paape, district representative in their Chicago territory, to the position of domestic sales manager. He will take over his new duties on March 28 at the main office of the company in Cleveland. E. F. Armington, former sales manager, will devote the major portion of his time to executive and management duties as secretary of the company.

Hewitt Robins, Inc., Buffalo and New York, and McKiernan-Terry Corp., Harrison, New Jersey, have issued a joint announcement containing the information that McKiernan-Terry has acquired the good will, drawings, jigs, fixtures, and spare parts of the Mead-Morrison Division of Robins

(Continued on page 175)

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Rogers builds trailers for unusual needs, embodying characteristic features of fundamental design, but modified to meet special requirements. With a Rogers Girder Type Trailer there is slight chance of being confronted with a headroom clearance problem. Special construction affords an unusually low bed.

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TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

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Shovel front and Hercules motor suitable for Bucyrus-Erie 19-B or 20-B. Shovel front complete with ropes and drum lagging. Hercules WXC gasoline motor, complete with radiator, electric starter, electric fuel pump, master clutch, drive sprocket, mounting brackets, and extra magneto. Motor ready to install and operate without delay. Box 3203

Two rebuilt Bucyrus-Erie hydraulically operated wheel type scrapers, model H-44, 4 cu. yd. struck measure capacity, mounted on two 11.00X20 pneumatic tires. Price on request. Box 3208

FOR SALE

1 steel hopper base for bin bottom, size 5'x9' complete with Johnson Gate, used on one job only. Can furnish shop drawings for same if interested.

McKEY FANSHER CO., Oskaloosa, Ia.

For sale in carload lots, 1,000,000 ft. 12x12 fir timbers, length 20 to 40 ft.; 50,000 pieces fir, gumwood, and hardwood piling, lengths 30 to 70 ft. Early spring and summer delivery. Box 3209

---

1 Michigan truck crane with backhoe & shovel attachments. Box 3205

Speeder ½ yd. crane, $3000. Barber-Greene 62A and vibrator, $3800. Slackline ½ yd. complete, $2500. Austin Western bin 21 yd., $800. R. D. 4 cat and end loader $4000. Weldon Lawrence, 320 W. 3rd St., Prophetstown, Ill.

New

DERRICKS

(ALL-STEEL, STIFF-LEG)

7 Available!

From U. S. Government Surplus. 30 Ton at 38 ft. radius; 60 ft. Boom with Bull Wheel.

Priced At a Saving!

FURNIVAL MACHINERY COMPANY

5405 Lancaster Ave., Phila. 31, Pa.
TRinity 7-5200

Int'l TD 40 diesel serial #7081 with Gar Wood hydraulic dozer in excellent condition. Chrysler industrial gas engine used one year on ½ yd. backhoe. Int'l K5 1941 3 yd. dump. Diamond T 1939 4½ yd. dump. Army Studebaker 6x6 new with 9 yd. new dump. Box 3204

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1 reconditioned TD-18 International tractor with new cable controlled Bucyrus-Erie Angle Dozer.
1 new generator set powered by Buda 6 cyl. gasoline engine, AC, 25KW, 3 phase, 60 cycles, 220 volts.
30 new Y-91 Continental Red Seal engines.
1 near new portable Greco lubrication unit, gasoline engine driven, complete with electric light plant, mounted on 1 ton, 2 wheel trailer.
1 reconditioned Kohler 1½KW generator set.
1 near new Williams dragline bucket, 1½ cu. yd.
1 near new Williams clamshell bucket, 1 cu. yd.
3 new Westinghouse Flex Arc welders, 400 amps.
6 reconditioned 2" Jaeger centrifugal pumps.
2 reconditioned Whiteman concrete finishing machines.

$25,000 worth genuine new Caterpillar parts priced for quick sale.

SERVICE EQUIPMENT COMPANY
P. O. Box 3035 Shreveport, La.

1938 Lorain "40" hoe including 35' crane boom, fairleads and dragline bucket. $6000. Box 3207

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3 yard shovel dipper in good condition, suitable for Bucyrus, Marion or other twin stick machine. Price $1000.
Phone 87 Box 196 Greenville, Ky.

Used chain crowd shovel attachment for Bucyrus-Erie 37-B; 21' boom 16'-6" handle, 1½ cubic yard all cast dipper. Location: Nebraska. Box 3200

For Sale—

SHASTA DAM AGGREGATE PLANT AND CONVEYOR EQUIPMENT

INCLUDING:

Late model GE motors, 200 hp., 1800 rmp., 2300/4000 volt, slip ring; complete with interlocking controllers.

Western gear reducers, 200 hp., 40 to 1 ratio, herringbone gears.

Dorr hydroseparator, 20' x 4', complete with drive unit.

8", 16" and 20" deepwell turbine pumps and one 3" x 4" two stage high head centrifugal pump. All complete with motors.

30" Bodinson tripper and trestle.

Misc. electrical equipment and supplies.

COLUMBIA CONSTRUCTION CO., INC.
Box 579 Redding, California

One set 54"x20" Garfield type crushing rolls complete with two 96" diameter x 16½" face pulleys. Capacity, 200 tons per hour with a 1" feed and a ½" product. Rolls built by Allis-Chalmers in 1931 and weigh approximately 109,000 lbs. Price $9,000 net F.O.B. Coleraine, Minn., without motors or controls. Box 3197.

New

BUCYRUS - ERIE PARTS!

From U. S. Government Surplus

Parts For: 15B, 20B, 22B, 33B, 37B, 54B, and 120B. Also: Gears, Pinions, Bearings, Bushings, Lining, etc.

Immediate Delivery From Available Stock. . . . At a Savings While They Last!

FURNIVAL Machinery Company

5405 Lancaster Ave., Phila. 31, Pa.
TRinity 7-5200

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2 Tractors & Scrapers

Allis model L tractors with lights, starters, bumpers, cast guard pan, hydraulic hoists. One with Continental 7-yd. 2-wheel scraper model CS74. One with Baker 5-yd. 2-wheel scraper model I80. Good condition. Real buy. George M. Pendergast & Co., Milwaukee 4, Wis.

Used Trailers For Sale
20 to 50 tons

LaCrosse	(Full)	Kingham	(Full)
Jahn	(Full)	Fruehauf	(Semi)
Rogers Bros.	(Semi)	Hughes	(Semi)

All In Excellent Condition

HUGHES TRAILERS CO.
1029 Brooke Blvd., Reading, Pa.

Surplus Swivel Hook Double Sheave Blocks

2 10 ton "American" 14" swivel hook double sheave block, diamond pattern with cast steel sheave bushed with self lubricating bronze bushings, grooved for ⅝" rope. Groove diameter 12¼" equipped with 100 lb. cheek weights. 2½" swivel hook. Approximate shipping weight 234 lbs. American Hoist & Derrick Co. Dwg. 1-M-6560.

1 10 ton "American" 14" swivel hook double sheave block, diamond pattern with cast steel sheaves bushed with self-lubricating bronze bushings. Grooved for ¾" rope. Groove diameter 10½" equipped with 100 lb. cheek weights. 2½" swivel hook. Approximate shipping weight 235 lbs. American Hoist & Derrick Co. Dwg. 1-M-6560.

1 40 ton "American" 24" swivel hook double sheave block diamond pattern with cast steel sheaves grooved for ⅞" rope. Sheaves to be bushed with plain bronze bushings, with center bored sheave pin and ¼" Alemite hydr. grease fitting No. 1980 equipped with 300 lb. cheek weights and 5½" swivel hook. Total weight of block 1190 lbs. Dwg. BEFP 1-M-6560.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

(For Sale continued on page 176)

For Sale

(Continued from page 175)

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS
2—½ cu. yd. Drag Shovel Dipper—17-B.
3—½ cu. yd. Skimmer Scoop Dipper—17-B.
1—¾ cu. yd. Welded Dipper—21-B.
1—1¼ cu. yd. Drag Shovel Dipper—38-B.
1—1½ cu. yd. Heavy Duty All Cast Dipper 42-B.
1—2 cu. yd. Rock Dipper—75-B.
F.O.B. Works
Write for any further information desired
BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

Used dragline attachment for 54-B Bucyrus-Erie. 70' boom, fairlead, including one 2½ cu. yd. medium weight type "AX" Bucyrus-Erie bucket and one 2½ cu. yd. Page type "RC" bucket. Both buckets in good operating condition, available for inspection Sioux Falls, South Dakota. Box 3210.

For Rent or Sale
¾ yd. Bucyrus 10-B dragline
½ yd. General shovel dragline
1 yd. Northwest shovel dragline
1½ yd. Koehring dragline, 65 ft. boom
2 yd. Page dragline, 90 ft. boom
3 yd. Monighan dragline, 110 ft. boom
5 yd. Monighan dragline, 140 ft. boom
5 yd. Page dragline, 115 ft. boom
20 yd. Marion dragline, 200 ft. boom
A. W. Nevers — Mt. Pleasant, Iowa

MECHANICS • HOME STUDY
Step up your own skill with facts & figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in handy form. Fully illustrated. Easy to Understand. Highly Endorsed. Check book you want for 7 days' Free Examination. Send no Money. Nothing to pay postman. □Carpentry $6 • □Auto $4 • □ Oil Burners $1 □Sheet Metal $1 • □Welding $1 • □ Refrigeration $4 □Plumbing $6 • □Masonry $6 • □Painting $2 • □Radio $4 □Electricity $4 • □Mathematics $2 • □Steam Engineers $4 □Machinist $4 • □Blueprint $2 • □Diesel $2 • □Drawing $2. If satisfied you pay only $1 a month until price is paid.
AUDEL, Publishers, 49 W. 23 St., New York 10, N. Y.

DRAGLINE SCRAPER, ½ Cu. Yd. SAUERMAN
Complete—New Condition—Heavy Duty
Price $250
Virginia Boat & Yacht Service
West Norfolk, Virginia

Complete backhoe attachment for Bucyrus-Erie 29-B. Excellent condition. Box 3196.

EQUIPMENT WANTED

5 to 10 cubic yard electric powered dragline, walker preferred, 150 to 180 foot boom, must be in good condition, needed in next few months. D. E. & R. A. Mills Limited, Box 418, Minto, N. B. Canada.

Used dragline boom suitable for Lorain 40 No. 2090. Must have fairlead and drum lagging. Box 3206

POSITIONS WANTED

Can operate any kind of shovel, dragline, crane or clamshell—steam, diesel, gas or electric. Can do own repair work. Experienced in quarry, ore and coal stripping. Prefer quarry or coal stripping. Familiar with grading work. Will go anywhere. Have release. Box 9254

HELP WANTED
Dragline operators for work in Central America for large American Company. Good salary plus yardage bonus.
Good living conditions. Expenses paid to job site.
Machines from ½ to 2½ yards.
Excellent opportunity for two-man teams accustomed to working together.
Write today for full information about this outstanding opportunity. Box 3201.

Notes from the Manufacturers

(Continued from page 174)

Conveyors, Inc. The two companies will cooperate in carrying out important harbor facility projects involving bulk materials handling equipment problems.

Barber-Greene Co., Aurora, Ill., has appointed Smith, Inc., Fargo, N. D., as exclusive distributor for their construction and industrial divisions in the state of North Dakota. This appointment provides complete facilities for sales, service, and repairs at the company headquarters in Fargo.

New trade literature

Title: **Blackhawk Porto-Power Catalog**
Subject: A 24-page booklet that covers Porto-Power hydraulic units in 2, 4, 7, 10, 20, and 50-ton sizes, along with attachments for push, pull, press, clamp, bend, and lift operations. Pipe benders are included accompanied by gauge equipment which adapts hydraulic power to laboratory uses. Besides listing the equipment and including a price schedule, the catalog shows how the use of the described equipment can speed work.
Where to Get: Blackhawk Mfg. Co., Milwaukee 1, Wis. (Free).

Title: **Simplex Util-A-Tool**
Subject: Describing in detail the various construction uses of the Util-A-Tool, this bulletin shows how heavy machines, tanks and beams can be lifted or lowered for installation and how scrapers, graders, tractors, road rollers, and other heavy construction machinery can be lifted or supported for repairs by this tool. Besides listing a wide selection of push-and-pull jacks and steamboat ratchet pulling jacks, the bulletin includes specification charts and price listing of the equipment described.
Where to Get: Templeton, Kenly & Co., Cicero, Ill. (Free).

Title: **LeTourneau Folder**
Subject: This 12-page folder pictures a wide range of LeTourneau applications covering projects ranging from general earthmoving, construction, mines, pits, quarries, and railroads to uses in industrial, agricultural and oil fields. Action photographs and factual caption-type descriptions are included.
Where to Get: Advertising Dept., R. G. LeTourneau, Inc., Peoria, Ill, or any LeTourneau distributor. Write for Form TP-126. (Free)

Title: **How to Handle Problems of Seniority**
Subject: Written by Dr. John Lapp, this is a detailed handbook on seniority based on company case histories, government and court rulings, and the author's own experience as an arbitrator in over 50 seniority disputes. In addition, the full text of seniority provisions in collective bargaining contracts between managements and unions in different major industries is presented in the back of the book.
Where to Get: The National Foremen's Institute, Inc., 10 High St., Deep River, Conn. (Price $4.00)

Title: **Blaw-Knox Buckets**
Subject: A new catalog that describes the Blaw-Knox two-line clamshell buckets and presents the buckets in a manner that facilitates the prospective user in selecting a bucket for his type of work. A combination of pictures and factual data enables a bucket user to coordinate his crane capacities with the data presented.
Where to Get: Blaw-Knox Co., Pittsburgh, Pa. (Free — Ask for Catalog No. 2076)

Title: **Federal Science Progress**
Subject: A new monthly magazine covering the field of government sponsored scientific and technological research. The first issue, dated February, contains a leading article describing the method of making rapid surveys of the soil conditions on construction sites by the use of aerial photographs.
Where to Get: Superintendent of Documents, Washington 25, D. C. (Subscription rates are $3 per year domestic, $4 foreign).

Title: **"Caterpillar" Scrapers**
Subject: A broadside that stresses specifications and production features of new Caterpillar scrapers, and shows how the scrapers are matched in capacity to the power of the manufacturer's diesel-powered tractors and built to perform with them.
Where to Get: Caterpillar Tractor Co., Peoria 8, Ill. Form 9372. (Free)

Title: **HD-7 Diesel Tractor**
Subject: An illustrated 24-page catalog that emphasizes the numerous features of the new HD-7 Diesel tractor. Given prominent display in the booklet are facts about the construction and design of this new Allis-Chalmers model. Specifications include pertinent facts and figures about speed ranges, engine dimensions, fuel capacities, shipping weights and track design.
Where to Get: Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis. Ask for Form No. MS-90A in conjunction with the bulletin (Free).

Title: **Hard Surfacing with Hardex Arc-welding Electrodes**
Subject: Covering hard surfacing and the use of Hardex Electrodes in building up surfaces for resistance to shock and abrasion, this new technical bulletin contains 16 pages of helpful information concerning such factors as effect of temperature and cooling rates on deposited metal, selection of the proper grade of rod, and recommended welding techniques.
Where to Get: Metal & Thermit Corp., 120 Broadway, N. Y. 5, New York. (Free)